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GENERAL EDITOR: C. W. GUILLEBAUD, M.A.

THE ECONOMICS OF TRANSPORT

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INTRODUCTION TO THE SERIES

By the General Editor

SHORTLY after the war of 1914-18 there seemed to be a place for a Series of introductory Economic Handbooks "intended to convey to the ordinary reader and to the uninitiated student some conception of the general principles of thought which economists now apply to economic problems."

This Series was planned by Mr. J. M. Keynes under the title *Cambridge Economic Handbook* and he wrote for it a general Editorial Introduction of which the words quoted above formed part. In 1936 Mr. Keynes handed over the editorship of the Series to Mr. D. H. Robertson, who held it until he became Professor of Economics in the University of London.

The judgment of its originators has been justified by the wide welcome given to the Series. Apart from its circulation in the British Empire, it has been published from the start in the United States of America while translations of the principal volumes have so far appeared in German, Spanish, Italian, Swedish, Japanese, Polish and Lithuanian.

It is symptomatic of the changes which have been taking place in recent times in the development of economic science, changes associated in a high degree with the work and influence of Mr. Keynes himself, that within the brief space of fifteen years the text

of part of the Editorial Introduction should have stood in need of revision. In its original version the last paragraph of the Introduction to the Series ran as follows :

“ Even on matters of principle there is not yet a complete unanimity of opinion amongst professors. Generally speaking, the writers of these volumes believe themselves to be orthodox members of the Cambridge School of Economics. At any rate, most of their ideas about the subject, and even their prejudices, are traceable to the contact they have enjoyed with the writings and lectures of the two economists who have chiefly influenced Cambridge thought for the past fifty years, Dr. Marshall and Professor Pigou.”

When the Editorship of the Series was transferred to Mr. D. H. Robertson, Mr. Keynes consented to the retention of his general Introduction, but subsequently re-wrote the concluding paragraph in the following form :

“ Even on matters of principle there is not yet a complete unanimity of opinion amongst professional students of the subject. Immediately after the war daily economic events were of such a startling character as to divert attention from theoretical complexities. But to-day, economic science has recovered its wind. Traditional treatments and traditional solutions are being questioned, improved, and revised. In the end this activity of research should clear up controversy. But for the moment controversy and doubt are increased. The writers

of this series must apologise to the general reader and to the beginner if many parts of their subject have not yet reached to a degree of certainty and lucidity which would make them easy and straightforward reading."

Still more recent events have produced a world so far removed from that which existed when the foregoing words were written, that it has fallen to the lot of the present Editor to provide a new Introduction.

This is perhaps a good vantage point from which to survey very briefly some of the principal trends in the evolution of economic thought in this country during the past thirty years. Prior to 1914 economic theory here was largely dominated by Alfred Marshall; and economists, following him, thought in terms of the long period tendencies of the different sections of the economic system towards positions of equilibrium, even though ever-present dynamic factors were perpetually modifying the existing structure and presenting new and equally distant, if equally unattainable, goals as stimuli to change and adaptation. Moreover, in the Marshallian system, those tendencies resulted from the working of persistent underlying forces which were conceived of as largely competitive in character. The increasing trend towards monopoly was certainly affecting thought, but not so much in the realm of the theory of value, as in the emphasis which came to be laid on possible discrepancies between the private interest and the social interest. Under the influence of Professor Pigou a Welfare Economics was developing side by side with, and out of, the Value Economics of the older generation.

After 1918 the long-drawn-out agony of the depressed areas, the weakening of the position of this country in international trade, and the tremendous intensity of the economic crisis of 1930-32 (to mention but a few out of the many contributing causes) combined, on the one hand, to focus attention on problems of the short period and, on the other hand, to throw doubt on the extent to which the self-adjusting, seemingly automatic mechanism, which on the whole had operated so effectively during the nineteenth century, was capable of coping with the deep-seated maladjustments and disharmonies which characterised the post-war world. At the same time value theory itself was profoundly influenced by the emergence of a number of writers who approached value problems from the view-point of monopoly, and emphasised the unrealistic nature of an analysis which was based on the assumptions of perfect competition and a perfect market. Most of all, however, economic thought was dominated by the desire to find a solution for the problem of how to maintain the level of effective demand so as to avoid the recurrence of phases of deep depression and widespread unemployment. There was a growing feeling of impatience with the economics of the long period "in which we are all dead", and a great, perhaps even excessive, concentration on the short period in which we live and move and have our being.

The result was a remarkable ferment of ideas, the challenging of ancient orthodoxies, and "for the moment controversy and doubt [were] increased." This ferment had by no means subsided when the second war with Germany broke out in September 1939,

bringing in its train a degree of State interference with the normal peace-time working of the economic system far exceeding that reached even in the last years of the war of 1914-18.

In so far as it is possible to foresee future trends, they would seem to lie in a much greater measure of conscious public control over many aspects of economic activity than has existed in the past. It will no doubt still remain true, to quote Mr. Keynes's Introduction again, that :

“The Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions.”

Nevertheless, economists may well find themselves to a greater degree than hitherto called upon to express their views on matters of economic policy, and—for a time at least—the writers of future volumes of the Cambridge Economic Handbooks may be concerned rather with specific problems than with the more general aspects of economic theory.

C. W. G.

Cambridge,
April, 1941.

AUTHOR'S NOTE TO NEW EDITION

As the proofs of this revised edition were passing through the press, the Royal Assent was given to the Transport Act, 1947, a measure which changes the whole structure of the industry. This Act transfers the railways, canals, and long-distance road hauliers of Great Britain to State ownership, and thereby creates a single vast inland transport monopoly. It also contains clauses enabling the acquisition to take place, later, of the nation's road passenger transport undertakings and the docks and harbours.

The administrative machinery for controlling this vast assembly of enterprises consists of a British Transport Commission as a supreme policy-making, financial and co-ordinating authority. The Commission is to be composed of a Chairman and between four and eight other members, all of whom will be appointed by the Minister of Transport. The following Executives, also appointed by the Minister, will exercise managerial functions over the various branches of transport on behalf of the Commission :—

Railway Executive,
Docks and Inland Waterways Executive,
Road Transport Executive,
London Transport Executive,
Hotels Executive (to be set up on an appointed day).

It is provided in the Act that all the business carried on by the Commission shall form one under-

taking, and the Commission is directed to secure that its revenues shall be not less than sufficient for making provision for the meeting of all charges properly chargeable to revenue, taking one year with another.

It is obviously impossible to deal here with the details of this enormous legislative measure, or even to indicate its chief probable effects on the economic structure of the country.

In his preface, the General Editor of this series observes that economic theory has in the last twenty years been profoundly influenced by the new treatment of monopoly and by the gradual abandonment of the conception of free competition and perfect markets as representing economic normality. And transport is a field in which monopoly has always, and necessarily, played a prominent part; since in many forms of transport (particularly those based upon the use of an artificial highway or track) the whole structure of the industry tends naturally to monopolistic organisation. This has led to a good deal of confusion in the past. Some writers have been led into arguments which led to highly unrealistic conclusions simply because of their unfamiliarity with the details of this complex industry. Others have confined themselves to a descriptive treatment which frankly abandons any attempt at an analytical treatment of a baffling subject. The problem of co-ordination has sometimes been falsely represented as a choice between monopoly and competition, whereas it was a choice between monopoly and imperfect competition, or "duopoly." However, the Gordian knot has now been cut by a Labour Government which has heavily committed itself to State-owned monopoly wherever it is administratively possible to introduce it.

It must be admitted that, at a single stroke, the unification of transport will sweep away many of the more complex problems and the new British Transport Commission will possess a degree of freedom, particularly as regards charges, for which its predecessors on the main line railways have sighed in vain for many years.

The chief points of criticism raised against the Act have not been theoretical objections to monopoly, but practical questions relating to administrative efficiency, and equitable treatment of dispossessed stockholders. The fixing of an arbitrary radius of operation for road vehicles as a test for whether hauliers' undertakings are to be acquired as being predominantly "long-distance," or left independent as predominantly "short-distance," is obviously full of difficulties. The devolution of authority from the Commission to the Executives on a functional basis has been described as a disintegration, rather than an integration, of transport facilities. The equity of the compensation terms, based upon current Stock Exchange values, which are offered to railway and canal stockholders, has been challenged. But there is no question that the broad principle of unification, so far as pure theory is concerned, will simplify many of the vexed problems of charges, costs and net revenue, that have perplexed the last generation of administrators, since the Commission will undoubtedly be able to charge "all that the traffic will bear" subject only to potential checks from "C" licence vehicle operation on the freight side and from private cars on the passenger side. Public transport will in fact be almost entirely monopolised and only private transport will offer the stimulus and the checks of competition.

When things are changing on such a scale and at such a pace, it is impossible to present a picture that will be truly up-to-date for more than a few weeks. And in revising this book no attempt has been made to describe the economic effects upon the transport industry of the recent war. The Road Haulage organisation set up by the Ministry of Transport and afterwards disbanded ; the control of the main line railways and London Transport, and their management for war purposes by the Railway Executive Committee ; the forms of war-time shipping control—all these are matters of great interest, and the student of transport should acquaint himself with their main outline. But it is too early yet to draw any general moral from their application. As the war recedes into the background we shall see its events in a better perspective. In any case, however, it would probably be unwise to attempt to reach definite conclusions when so great an upheaval as will be caused by the provisions of the Transport Act is in progress. When the convulsions have died down and the lava has ceased to flow, we shall be able to take stock of the new landscape as it appears after the earthquake.

M. R. B.

September, 1947.

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THE ECONOMICS OF TRANSPORT

CHAPTER I

THE FUNCTION OF TRANSPORT

§ 1. *Utilities of Place.* Transport, as a subject, stands somewhat apart from the general body of economic phenomena. It has not the special theoretical interest attaching to monetary studies, although some writers on railway economics appear to regard discriminating monopoly in transport as something which is not given its proper significance in orthodox economic theory. Yet transport, with its immense financial and technical significance, is undoubtedly one of the major problems of the age, and the study of where, and how, its organisation fits into the apparatus of production is of great practical importance. And there is a very real theoretical interest attached to certain problems, such as the basis of road and rail competition, which have arisen comparatively recently, and still lack a satisfactory solution.

It is impossible to make a clear distinction between transport and "production." A familiar platitude states that in reality goods are neither produced nor

consumed. The sum of human activity does not increase or diminish the aggregate of this planet's matter. Such verbal nicety helps us to remember that "man is a spirit," and goods are but satisfactions. If this is borne in mind, the creation of utilities through individual efforts and sacrifices ceases to be identified with physical creation, as implied in the word "production". Matter is more desirable or useful in one form than another; and accordingly mankind is busy stimulating or assisting Nature to change the seed to the fruit, the ore to the metal. Matter is more desirable at one place than another, at one time than another; and thus transport and distribution, and the whole merchanting mechanism are evolved. The function of transport is to carry commodities from points where their marginal utility, the significance of a little more or a little less, is relatively low to where it is relatively high. This process is interleaved, as it were, with the process of physical change, so that the final utility of any commodity can be visualised as composed of "layers" of different utilities—of form, of place, and of time.

There is at any rate a verbal question whether transport is more accurately described positively, as producing new utilities of location; or negatively, as breaking down and removing the disutilities imposed by distance. This much may be said for the latter view, that thereby it is perhaps easier to visualise how universal is the importance of transport. There are many barriers, both on the side of demand and of supply, which prevent a given flow of resources achieving a maximum of satisfaction, and one of the greatest is physical separation. Transport, by attack-

ing this obstacle, enables a given flow of resources to produce greater results.

Such an argument may appear academic and remote from experience. But it has had an obvious relevance in so practical a matter as determining a railway rate. In the Greenock sugar case, for instance, it was argued that it was inequitable for the railway to charge identical rates for the transport of sugar to the English midlands from London and from Greenock, since the latter journey was twice the length of the former. This procedure, it was contended, destroyed the natural advantage over their Scottish competitors which the London firms owed to their geographical situation. However, the contrary view prevailed ; it was held that transport is fulfilling its true function when it benefits the consumer by extension of the market and breaks down the advantage, perhaps amounting to semi-monopoly, which individual producers may derive from situation.

Certain forms of transport, of course, are not merely a contribution to the final utility of something else, but are themselves a " consumer's service." Much passenger transport falls under this definition ; not all, since journeys undertaken in the course of business are incidental to production. But it is of little importance to distinguish between the utility of the railway to the business man travelling to Manchester or Pittsburg and to his wife going " South for Sunshine." The essential point is that transport services are a vital part of the flow of utilities comprised in the economic system. Like monetary theory, transport is often treated somewhat apart from the ordinary body of economic doctrine. But its problems are complicated through

confusing detail rather than any failure to conform to general principles; and their solution is one of the major issues of the present time.

§ 2. *The Demand for Transport.* Although transport is essential to that standard of individual consumption which we regard as the hall-mark of civilisation, and the command of rapid and comfortable travel is itself regarded as an indispensable part of culture, yet the demand for transport is not fundamental in human nature. It cannot compare with the elemental desires for food, warmth, clothing and shelter. Nevertheless, the collective demand for transport of an organised society with a high "standard of living" may be exceedingly strong; since the entire mechanism for satisfying primary demands—above all for food—may, as in the case of Great Britain, rest upon efficient transport. The ultimate demand for transport may thus be derived from that for the necessities of life, and be correspondingly inelastic. To some extent, therefore, transport is analogous to other services for which derived demand is very strong although direct demand is weak or non-existent; for example, justice, police or national defence. These cases all exhibit the same characteristic: that the satisfaction of the individual's elemental needs depends ultimately upon the provision of services for which the individual has a low conscious demand. The collective derived demand is, however, strong enough to ensure supply at the expense of the community.

. The analogy between transport and justice or defence is only partial; but it may be remembered, when the question of monopoly is considered later, that these

latter services are cases in which there is no response to individual demand through competitive supply ; there cannot, save perhaps in a feudal state, be competing systems of law or defence. The system of price breaks down when it is a question of providing an elementary school, a battleship or a police station ; supply is **unrelated** to individual demand. In certain aspects of transport (the construction of roads from the proceeds of taxation, legal provision for workmen's trains on railways, for example) the community similarly bridges the gap between demand and supply by special action which ignores the criterion of " effective demand price," the common arbiter of economic activity.

A somewhat loose distinction is often drawn between an " industry " and a " service." If we assume that the former relates to the production of utilities under the stimulus and control of an ordinary price-system, and the latter to their production independently of such a system, then transport is a blend of industry and service. In a highly organised industrial community a large part of the demand for transport can be and is effectively expressed as a money price. On the other hand, where the individual demand ceases to express itself in an effective money price there may sometimes be a latent collective demand. The normal operation of the price-system would leave this demand unsatisfied. But the special place of transport in the production of welfare may lead the State to satisfy this latent demand at the public expense. It is a truism that there is a part of men's incomes which they can with best advantage to the community spend themselves ; another part which it is equally desirable that the State should spend for them. Transport expenditure

comes under both those heads, being intermediate between ordinary consumption goods and social services such as street lighting, elementary education, justice and police.

§ 3. *Specialisation.* It is an obvious truth that the many types of specialised production which comprise industrial civilisation depend upon a developed and efficient system of transport. But the generalisation can be narrowed down. In the first place the character of "specialisation" must be examined. When Adam Smith wrote of the Division of Labour he was thinking largely of specialisation within more or less self-contained groups of individuals. Where the group is a small one, such as a family or a village, a certain standard of specialisation can be attained without inducing a transport problem, if raw materials can be obtained locally. Certain communities can thus combine a fairly high degree of self-sufficiency with a fairly high standard of living by purely "internal" specialisation—the division of labour pure and simple. But if the pressure of population exceeds the productive capacity of the neighbouring countryside, or if some article of special quality or repute can be produced which can be advantageously exchanged for the products of other communities, then a transport problem arises. The increased standard of living associated with "external" specialisation of whole communities is historically linked with the great advance in transport methods during the nineteenth century. The inventive genius of the eighteenth century was not lacking, nor was the business acumen of the "man of enterprise" undeveloped; but until transport could be cheapened and

extended their force was latent, and the simultaneous expansion of population and wealth was baulked of its full momentum.

The term "Division of Labour" is inadequate to describe the specialisation which has led to whole communities devoting themselves to producing one commodity—usually raw materials, such as rubber, nitrate or timber; or foodstuffs such as wheat, tea or coffee. There must be a division of land and capital as well as of labour. And in promoting this specialised use of land and capital the two essential agents are transport and communications. The division of labour inside a community, the evolution of those familiar village craftsmen, can take place independently of transport; but it is very obvious that the specialised use of land, which cannot be physically concentrated in a narrow radius, requires efficient transport. The division of capital—in particular the separation of the two functions of risk-bearing and management—depends indirectly upon transport, through the need for communications. Transport and communications were closely linked until the extension of the electric telegraph, and retain some relationship. The division of capital relies upon communications to provide intelligence of opportunities for investment, and for overlooking investments already made; it also depends upon the arrangements which can be made for the transport of value—for making and receiving payments in distant places.

There are certain rather curious results of the growth of specialisation. In the first place, as methods of production become more roundabout in order to achieve the maximum efficiency, transport becomes increasingly

occupied in transforming the finished product of one industry into the raw material of another. But this increasing importance of transport costs may at the same time encourage a different tendency, toward the integration of processes which specialisation formerly separated. The necessity for minimising transport costs at a time when the price of the finished product is falling may lead to reorganisation in order to reduce intermediate handling. The physical grouping of blast furnaces, steel melting shops, and rolling mills in the steel industry is a conspicuous example. Specialisation frequently implies the separation of manufacturing processes from both the source of raw materials and the market supplied ; but transport often determines the exact relation which the site bears to these two points of attraction. The fact that the finished product is generally less in weight than the raw materials of which it is composed may attract industry back to its sources of supply ; but lower transport charges, for instance railway rates, imposed upon the raw material than on the finished article may attract it forward to its markets.

One other result of improvements in transport may be noted. While labour and capital have extended their range of useful application, land has tended to become more restricted^{*} to a single purpose. No amount of improvements in transport can render it mobile ; the specialised uses must be brought to the land. Thus certain areas of the world have become increasingly dependent upon a single product—coffee in Brazil, wheat in Canada, wool and mutton in Australia—while other areas have been able to introduce manufacturing industries, in which the use of land is of secondary importance, with little regard to

geographical specialisation. In the past such industries frequently were located where local capital and local labour could be drawn upon. But with the increased mobility of factors of production due to improved transport there is on the one hand a wider diffusion of industry through the great manufacturing countries of the world, and on the other hand a narrower concentration upon a single product in areas devoted to agriculture or extractive industries—mining, quarrying, etc.—dependent upon the qualities of the soil itself.

It would be idle to ignore the fact that in some respects the tide, as regards international specialisation, seems to have turned. The blast, first of economic depression and then of war, has struck at the root of the whole principle of international specialisation. It is suggested that greater stability may be obtained from a lower standard of living which unites the fortunes of producers and consumers more closely, and offers a degree of self-sufficiency despite a lower standard of consumption. The resulting sacrifice of welfare is regarded as the payment of an insurance premium, the price of relative security. Time alone can show whether this view is justified; but transport today is vitally concerned in the solution of a problem which it has itself to some extent created, through enabling international trade to outstrip the financial and political progress with which it should be associated.

§ 4. *Some Social Effects of Transport.* Many writers have hymned the moral and social progress which industrial civilisation is considered to have brought in its wake. The effects of improved transport in particular have been the subject of panegyric. Nor is this insis-

tence merely retrospective—that the lives of our predecessors seem to have been so often “poor, nasty, brutish, short” that we are conscious of a grateful superiority. On the contrary, at the threshold of the Railway Age transport was hailed as the universal panacea. Dr. Arnold of Rugby rejoiced to see the railway “and to think that feudality is gone for ever.” The compiler of Osborne’s *Grand Junction Railway Guide* wrote in 1838: “By means of Railways, institutions and customs, laws and language, will make rapid progress in assimilation, over every part of the united kingdom, and the world at large. Newspapers and periodicals, pamphlets and small volumes, containing the seeds of improvement, civil, scientific, moral and religious, will be dispersed with tenfold rapidity. Orators, Lecturers and Missionaries will be multiplied. . . . Villages and small towns will gradually exchange their dialect for the national tongue, by the increased frequency of communion with other places and persons; and customs and superstitions that have for ages resisted the progress of other agents, will give way to the force and rapidity of this.”

How far have these high hopes been realised? The effects of transport have been twofold. On the one hand, through promoting specialisation a higher standard of living has been made possible; on the other, through the spread of information and ideas, the desire for improvement has been fortified. The process outlined by the author of Osborne’s *Guide*, for all its *naïveté*, has obviously taken place; a pessimist would add that its most conspicuous result has been an increased preoccupation of the smaller places with imitating the standards of living of the capital—an

accelerated transformation of the luxuries of one generation into the conventional necessities of the next.

Economists commonly pay lip-service to the maxim that no clear line can be drawn to separate economic and non-economic satisfactions; but they generally hurry off the frontier territory of social history or psychology as soon as possible. Yet many of the effects of transport are so remote from contact with "the measuring-rod of money" that some attempt must be made to set economic and non-economic effects side by side. The growth of transport has undoubtedly helped to satisfy old elemental wants more adequately, and has created new ones. In the economic sense of the word, this has no doubt increased "welfare." On the other hand, the dissemination of information and the "small volumes" of the Victorian prophet have tended to impose a certain drab uniformity of outlook; views are second-hand; people who are well informed may be poorly opinioned; even prejudice may be preferable to apathy. The racy dialect is succeeded by a stilted "standard English" like the language of a policeman in the witness-box. It may mean better crops if "every valley is exalted" and "the high places made low," but it certainly spoils the view. The economist, by definition the student of "mankind engaged in the ordinary business of life," cannot listen to the Eastern philosopher who regards welfare as springing from Nirvana, the elimination both of desires and their satisfaction. But he can, while retaining the Western philosophy of achievement, protest against the senseless snobbery of much advertisement, the mass-produced demand which transport

has created along with the possibility of mass supply.

It is on the psychological side that transport is most vulnerable. The lack of variety in human character which is a product of cosmopolitanism is a very real loss. Contact with one's fellows does not always enrich and extend human experience ; it often merely rubs away the distinguishing marks of the individual. Not all the items on the debit side are of this psychological nature. Some are direct disutilities that have a definite money value. For instance, where a railway was constructed to serve a new steelworks, and at the same time as it supplied raw materials and distributed the finished product, failed to provide cheap and adequate passenger transport in order that the workers might live in healthy surroundings away from their work, it involved the re-housing of the workers by a later generation, usually to some extent out of public funds. Slums are largely a product of the ill-balanced growth of transport.

In another sense transport creates its own difficulties. Improvements in transport facilities act as a spur to production, and attract labour and capital into the area over which they are effective. If the improvements in transport have been made without allowing for this effect, they will shortly be outpaced. The most obvious illustration is that familiar evil of our time, " ribbon development." In order to relieve a congested road, a new road was built. The rise in the value of land produced by proximity to a main traffic artery attracted speculative builders who proceeded to erect houses, shops and factories along the line of the new road. Before long the main road became congested with local traffic, particularly distributive services, and the

problem of "by-passing the by-pass" presented itself.

None of these disadvantages are, it will be noticed, inherent in transport. They are functional and not organic diseases. Such a diagnosis immediately prompted the remedy of economic planning. The theoretical case for transport planning will be set out later; but it may not be out of place to anticipate it here by mentioning two *prima facie* arguments in its favour. First, there are the special conditions of demand already mentioned. Secondly, there is the fact that changes in the technique or efficiency of transport affect *all* industries, not in equal degree, but to some extent. This tends to set transport apart from other industries, changes in whose technique are likely to affect *some* other industries, but practically never all.

CHAPTER II

THE MEANS OF TRANSPORT

§ 1. *The Vehicle and the Highway.* Transport of material goods implies two factors : a vehicle or unit of conveyance, and a medium in which, or upon which, to move. The choice of medium determines the type and design of the vehicle. Across wild country, hills and valleys, rocks and swamps, the " vehicle " can only be a domesticated animal or the featherless biped, man. Direct portage is of little interest to the economist, although it is surprising how important a traffic has been carried on for centuries where no artificial roads exist, as in parts of Africa to-day, by human porters, strings of pack-horses, or camel caravans. But it is a form of transport which cannot be organised so as greatly to reduce costs, and for goods other than those of high value in relation to weight and bulk is too expensive.

The first step towards a more efficient form of transport was to obtain a larger and more economical unit of conveyance. A distinction immediately arises between vehicles which can use highways provided by Nature and those which require an artificial track. We can classify the means of transport as using public tracks—the sea, rivers, the air ; or private tracks, such as railways or canals. Roads occupy a somewhat inter-

mediate position, since, although artificially constructed, they are not reserved for any single type of transport, nor, generally, are they private property.

The chief and most obvious distinction between transport agencies using public, and those using private, tracks lies in the greater command over capital required before the latter can come into existence. It is a test of an economically advanced community, that it can employ considerable resources in furthering enterprises which may yield little direct return, but which will ultimately yield very high economies in producing a given output and will thus set free resources to be employed elsewhere. Much transport expenditure comes under this head; but before seeking the economies which can be realised by heavy outlay on canals, for instance, the possibilities of sea and river transport were fully explored, involving as they did a much smaller and more flexible unit of outlay.

§ 2. *Public Tracks: The Sea.* Two factors probably contributed to the early use of rivers and the sea for transport; the natural curiosity which led men to explore the unknown, and the possibility, once the principle of buoyancy through displacement was vaguely understood, of moving heavy goods easily across the surface of the water. A considerable amount of capital expenditure took place in marine transport apart from the ships themselves. Harbour works were constructed, and the great Pharos of Alexandria lit its lamp in the ancient world, as the main routes of commerce took shape. But there is one point which must be noted. The flow of commodities, and the organisation of transport in response to this

flow, was by no means the logical process of exchange and specialisation that exists to-day. Those who possessed command over capital utilised it to enrich the lives of a few with commodities unobtainable in the narrow circle of home production—from which came the importance of spices and jewellery in early trade. International commerce was not so much the result of relative price-structures, as the food of princely imaginations, crying out, like Faustus :

“ I'll have them fly to India for gold,
Ransack the ocean for orient pearl,
And search all corners of the new-found world
For pleasant fruits and princely delicates.”

Commerce, although always tending to become less exclusively concerned with rare articles of high value, might be one-sided. The “ quinquere of Nineveh ” with its cargo of “ peacocks, apes and ivory ” gave place to the prosaic Roman grain-ship in the trade between Northern Africa and Ostia or Brundisium ; but the cargo might still be tribute from one country to another, a perpetual “ reparations ” in which there were no economic foundations of mutual benefit. Under a powerful empire, transport might reach a high degree of organisation ; but until the advent of specialised productive methods and foreign trade based upon comparative cost structures, it was not part of the framework of society.

Looking backwards, the process of change in the technique of ship construction and operation seems to have been a more gradual and continuous process than the corresponding changes in land transport. In one of Mr. Kipling's verses Noah is represented as taking an

intelligent interest in the construction of a modern sea-going vessel ; and there is a good deal of truth in his contention that " things has altered in the shipping trade " very little since " things was made." Steam did not replace sails in the way that railways replaced the stage coach almost overnight. Fulton's *Clermont* began puffing along the Hudson River in 1807 ; yet the sailing vessel can only be said to have reached its final stage of development about 1890, when schooner-rigged ocean carriers of up to 5,000 gross tons¹ were being constructed, with steel hulls, framing and masts—only distinguishable from a modern cargo steamer by the method of propulsion.

Even before the advent of steam propulsion, ships could be roughly classified into groups corresponding to the present-day division into liners and tramps—those engaged in a regular service, and those that seek freights wherever they can find them. In the late eighteenth century the great armed vessels of the British East India Company, the " East Indiamen," were the closest ancestors of the modern liner, while the " Free Trader," a smaller and faster vessel, was the forerunner of the modern cargo tramp. But for many years after steam propulsion had been technically possible, it was confined to the liner trade. A steamer carrying mails and passengers only could cross the Atlantic or make a Far Eastern voyage under its own power ; but as late as the last quarter of the nineteenth century it was often considered that the bunker space required for the coal made steam uneconomic for freight tramping. It was not until the compound engine, with its great

¹ Gross tonnage measures the vessel's cubic capacity on a basis of 1 ton = 100 cubic feet.

economies of fuel consumption, had been introduced and perfected that the gradual replacement of the sailing clipper by the modern tramp steamer was possible. Throughout the greater part of the last century, while mails and passengers were carried by steam along the main ocean routes, the majority of the world's seaborne commodities was still carried by sail. It was not until 1893 that the world tonnage of steamers first exceeded the world sailing ship tonnage, although the change in the relative positions has been rapid since that date.

The competition between British and American shipowners in the last century was concentrated in the freight trade. The Americans had natural advantages in their immense soft-wood supplies for building economical sailing clippers. The British, however, regained the supremacy they had lost in this field when iron and steel construction replaced wooden hulls, and when, later, it became possible to design a tramp steamer with compound engines which could compete with the sailing vessel as a cheap transporter of goods. The preference of the private American shipowner for wood and sails, was only equalled by that of the British Admiralty.

Until the 1914/18 War British supremacy in world shipping was unchallenged. The heavy loss of tonnage during that war from enemy action, and the remarkable expansion in the American shipbuilding industry towards the end of the war, produced a profound change in the situation.

Apart from the shift in the relative positions of the United Kingdom and the U.S.A., the ratio of ocean shipping tonnage to the volume of international trade

had changed considerably. At the end of 1936 the Liverpool Steam Ship Owners Association produced an interesting report giving statistics which showed how the increase in the quantum of world trade from 1913 to 1929 was less than the increase in the tonnage of shipping available to move it, involving a general degree of unemployment. The figures are set out in the following table :—

Index of World Trade (League of Nations figures) 1913= 100		Index of Ocean Shipping Tonnage (Lloyd's Register Figures) 1913= 100
Year	Quantum	Total (2,000 tons and upwards)
1913	100	100
1929	130	157
1932	97	163
1935	107	150

Nevertheless, as late as 1929 the disparity was not so wide that British shipping could not secure employment on an economic basis. But when the depression came, although the index of world trade had fallen from 130 in 1929 to 97 in 1932, the total volume of available shipping had actually slightly increased. The result was a disastrous fall in freight rates, shortage of work and a disproportionate competitive power attaching to subsidies received by certain foreign fleets.

The trade recovery towards the end of the 1930's to some extent alleviated the position, but British shipping had not regained its former supremacy when the Second World War broke out in 1939, in which the

losses suffered by Britain and the enormous expansion of U.S.A. building capacity were even more dramatic than in the first.

§ 3. *Rivers.* The importance of rivers to an undeveloped community can hardly be exaggerated. They provide a smooth highway which is free from the worst dangers and uncertainties of the open sea, on which the sea-going vessel and the dug-out tree-trunk alike may pass. It is a very old adage that "mountains divide; but rivers unite." Along the great rivers of Europe and Asia civilisation has spread; the tide of foreign conquest has generally flowed inland along the line of the great rivers. There are disadvantages to compensate; it is true that in tidal reaches the river may provide both a highway and motive power, and many lighters are still navigated up and down the Thames without propulsive mechanism, merely following the ebb or the flow and anchoring at the turn of the tide. But above the tidal influence the current flows in a constant direction and considerable effort may be needed to make passage upstream. Rivers are often circuitous; the presence of shoals or rapids may stop through navigation. Many rivers moreover are liable to silt up, or to change their course, and inland ports may find themselves stranded. The fate of Rye is an example: it is only by constant dredging that Liverpool escapes the same doom.

Natural capital, if the term be used somewhat loosely, exists in the navigability of the sea and rivers. But where human efforts have been directed to providing harbours and terminal facilities, these public tracks may be subject to private rights and it is

possible by what is known in international law as the principle of "cabotage" to introduce a monopolistic element into the use of the sea by reserving the right to carry goods between two ports on the coast of the same country to ships under that country's flag. A further intrusion of the private principle into the use of the ocean highway may occur when a maritime canal is constructed. The monopoly possessed by the Suez Canal Company is an obvious example; in this case, however, the exploitation of the canal is purely commercial. The Panama Canal, controlled by the United States Government, is in a rather different position. Under the original Hay-Pauncefote treaty the canal was to be open to the commerce of the world on equal terms; but when, as a result of violent political change in Central America, the Canal Zone was in effect ceded to the United States, it was intended to use the canal tolls as a lever to reduce trans-continental railway rates in the United States. The proposal to allow American vessels engaged in the domestic coasting trade to pass toll free aroused so much international opposition, however, and involved so many practical difficulties in the way of defining eligibility for exemption, that it was abandoned shortly before the canal opened in 1914.

International law is widely concerned with the question of one State acting as a monopolist of transport facilities *vis-à-vis* another. In the course of years a code has been evolved under which the majority of the world's sea-borne traffic is carried on with a minimum of interference apart from safety regulations. But in the case of rivers, particularly rivers which carry a large transit traffic (i.e. transport crossing one State,

yet having both its point of departure and its destination outside that State), special safeguards may be necessary. " ' Waterways of international concern ' are those which are accessible to ordinary commercial navigation and which provide more than one State with access to the sea. These have for a long time come under general or particular international agreements. More than a century ago, the French Revolution proclaimed complete liberty of navigation and equality for all flags on these waterways and they were considered as being international. The Congress of Vienna discussed measures for applying these principles which became the basis, in the nineteenth century, for regulating navigation over the great European international waterways, such as the Rhine and the Danube, and also over the great African waterways. It is evident that co-operation is essential for the reasonable use of these great traffic routes. No State traversed by one of those waterways could monopolise it for its own profit without doing injury to itself, since the other riparian States would take similar action. States situated far up the course of the great international rivers would particularly suffer, especially those deprived of access to the sea, for in their situation, freedom of navigation on waterways of international concern is equivalent to the right of free access to the sea."¹ The River Scheldt is one of the best examples of an international waterway, since the principal Belgian port, Antwerp, is situated on a river whose only outlet to the sea lies through Dutch territory.

¹ *International Transit and Communications*—League of Nations pamphlet, p. 13.

§4. *Roads.* The organisation of road transport involves the use of tracks which, while not usually private property or constructed by private means, do involve heavy upkeep costs and a conscious choice of routes which is not involved in sea transport. To a limited extent, no doubt, where the road system has been constructed by the State and thrown open to all without making a charge based on use, the transport agencies which use it are in a position similar to that of sea or air transport. The feature called the "heritage of the past" is especially important in studying the social costs of road transport. Past generations have spent money in improving the roads, but the value or the cost of these capital works frequently cannot be ascertained. In the Middle Ages roads were often maintained as pious works—although piety alone was sometimes inadequate; in the time of Edward III "William Phelippe the hermit" was authorised to set up a toll-bar on Highgate Hill, near London, and levy tolls for the upkeep of the road.¹ The Romans constructed the foundations of many magnificent highways, still in use in Europe, with slave or conscript labour. It is clearly impossible to assess such costs in money terms. Where the "legacy from the past" has not involved the creation of government debt so as to interfere with the present distribution of wealth, for practical purposes it can be treated as though it were capital provided by Nature. Roads, except in so far as they have been specially improved or reconstructed to deal with motor traffic, can probably be so treated, and the question of original cost or capital value ignored, without doing violence to economic principles

¹ Pratt: *History of Inland Transport*, p. 13.

or common sense. In France an exactly analogous situation exists in respect of the canals, which, though constructed by private enterprise in the first place, "have at various dates been taken over by the State. . . . The waterways are free from tolls as the roads are in England."¹ Thus the present generation benefits from the efforts and sacrifices of past generations as though these formed part of the natural resources of the country.²

But the legacy of the past was not always appreciated by the inheritors. All over Europe, once the Roman highways had ceased to be kept in good repair, roads appear to have suffered from neglect and ignorance. The surfaces were deeply rutted with wheel-tracks; the softer parts were washed away by rain, leaving great potholes in the ground. The common method of repair was to fill up these holes and ruts with loose stones. These stones tended to be dislodged and dispersed under the weight of traffic, and they by no means hindered the accumulation of water. Two men finally demonstrated in England the principles upon which a road must be built for heavy traffic. Telford showed that the route must be carefully graded and aligned and a solid foundation built up with proper drainage; MacAdam showed how a top layer of *broken* stones of equal sizes would consolidate under the effect of traffic into a hard and waterproof crust. But by a curious irony, the task was no sooner accomplished than it was rendered unnecessary. A few attempts were made to adapt steam propulsion to use the fine highways which Telford and MacAdam had rendered possible; quaint monstrosities like

¹ Cadbury & Dobbs: *Canals & Inland Waterways*, p. 114.

² Assuming the purchase of the canals to have been financed from the proceeds of taxation and not by borrowing.

Gurney's steam carriage, a kind of fiery pantechicon, made a few journeys. But penal legislation and heavy turnpike tolls combined to ensure that the future of steam should be on rails ; and for nearly a century the main trunk roads felt only the beat of hooves, and the wheels of farm-wagons, gigs and carriages, and an occasional carrier's cart.

The internal combustion engine, with its peculiar power output characteristics, has proved highly successful in road transport both for passengers and goods. The most important development in the twentieth century has been the growth of competition between systems using private and public tracks respectively, and the fact that the technical development of the road vehicle has, temporarily at any rate, outstripped the technical development of the track—of which the road death-rate is the most distressing symptom.

The renaissance of the roads is sufficiently fresh in the memory of the present generation for it to be unnecessary to stress the special advantages of road motor transport. Its distributive ability (there is hardly a house in Great Britain which is unconnected with the national road system), its economy of power, and flexibility of operation and organisation are obvious. It is probably true to say that road motor transport has effected a more profound change in the social characteristics of nations than the railway. For the railway only placed travel facilities within the reach of all who cared to seek them out ; the road thrust them into everybody's grasp. This is especially true of rural areas, where the rapid transition of the automobile from a luxury to part of the standard equipment of the farmer needs no emphasis. And country 'bus

services have done more in twenty years to develop the habit of travel in rural communities than any other means of transport did during a century. Even where it competes directly with the railway, road transport has created much new traffic. Its cheapness, whether this be partly derived from ability to transfer part of its social cost to other sections of the community or not, has undoubtedly tapped levels of the demand for transport which before went unsatisfied.

Road transport, also need not be carried on as a separate business. The private individual can operate a personal transport system for his own pleasure, arranging journeys by car to suit his own convenience and purse. It is entertaining to recollect that when railways were new it was considered that they were an agent of democratisation, since the Duke stepped unnoticed into a first-class carriage and was carried together with hundreds of other people, travelling at equal speed with his social inferiors instead of bowling along the highway in solitary glory. But the car has proved an even more powerful agent, since not only the Duke, but his grocer and his gardener have their own private conveyance; and this type of democratisation implies a levelling up rather than a levelling down of standards.

The same adaptation to private use is found in the transport of goods. In Great Britain it is estimated that over three-quarters of road freight transport is carried in the vehicles of traders, and not "for hire or reward" by commercial hauliers. The greater part of these private or "ancillary" vehicles are engaged in distributive work; but certain firms, especially "vertical" combinations which contain a large number

of factories performing successive operations in the manufacture of a single article, use their own vehicles for the regular transport of raw material and finished articles in bulk. The power of controlling their own transport is a great convenience to many firms, and the advertising power of a fleet of smart vans displaying the firm's name on the public roads is another advantage.

The organisation of commercial road haulage of goods in Great Britain really began shortly after the 1914-18 War, when boom conditions induced many ex-service men and others to purchase surplus army vehicles from the Disposals Board and start business as owner-drivers. The more successful enterprises acquired fleets of vehicles and provided regular services of high quality ; but the average size of firms remained small and the owner-driver with at most two or three vehicles the characteristic unit. Under these conditions " cut " rates were common, especially in cases where the vehicle had been bought on the hire-purchase system and cash had to be available for the next due date. Return loads were a critical factor which often made the difference between profit and loss, and the hawking of such loads by owner-drivers frequently made the quotation of economic rates by established concerns ineffective.

In order to co-ordinate return loads and rates, attempts were made in various towns to set up freight exchanges or Clearing Houses for road transport, but these met with little success in most cases. The exchange instituted by the Nottingham Chamber of Commerce was a notable exception. But the practices of the Clearing Houses frequently tended to aggravate rather than improve matters.

A witness before the Royal Commission on Transport,¹ stated that "it frequently happens that unscrupulous persons set themselves up in the Clearing House business (in the City of Liverpool alone there are twenty-seven Clearing Houses owning no vehicles at all, and similar conditions obtain in most large towns), and obtain their trade by under-quoting the organised hauliers and railways, and then beating down the owner-driver to the cut rate less the Clearing House commission." The possibility of such abuses is especially strong when the Clearing House has supplied the vehicle to the owner-driver on hire-purchase terms.

Commercial passenger road transport falls into two main divisions—urban street transport and long-distance carriage. The characteristics of different forms of urban transport are discussed later. Long-distance motor coaches are highly competitive with railways, offering a somewhat similar service, generally rather inferior in comfort and speed, but, on the existing bases of motor taxation in most countries, considerably cheaper.

§ 5. *The Air.* Air and sea transport alike benefit from the fact that nature provides a highway free of charge; and equally, they both need special facilities in the shape of harbours or airports at the points of contact with the land, and special navigational aids. Air transport, however, has the great advantage that the element in which it moves is universal and it can pass (apart from weather variations) with equal ease over practically all the surface of the globe.

The paradox of air transport lies in the combination of remarkable technical progress and spectacular feats

¹ Final Report, p. 87.

of performance with consistently disappointing commercial results. Aeroplanes have revolutionised the science of war, and the Atlantic is now crossed in a few hours, yet there is scarcely an important air line in the world that has been able to operate without a State subsidy, either direct or through mail contracts.

The chief reason for this disparity between technical progress and commercial results lies in (*a*) the essentially uneconomic principle of expending power merely to overcome the force of gravity—a problem entirely foreign to surface transport—and (*b*) the high rate of depreciation and obsolescence of aircraft, the cost of which must be written off out of earnings in perhaps three to five years as compared with the thirty years' average life of a railway locomotive. The rate of obsolescence is of course the price that must be paid for the amazing rapid technical progress in the aircraft manufacturing industry. So far as can be seen, this fundamental handicap will continue to exert a dominating influence on the economics of air transport. On the other hand it may well be that increased demand and growth in pay-load capacity of aircraft will so increase earning capacity that the need to cover these high rates of obsolescence will no longer dominate the finances of airline operation, and unsubsidised or even profitable operation may become a commonplace before many years have passed. But it is a sobering reflection, in making comparison between sea and air costs, to realise that an aeroplane may produce only 1,800 lb.-miles per horse-power, against 92,400 for a ship's engines; whilst on a trip of 2,000 miles an aeroplane will burn 2,040 lb. of

oil fuel for every ton of freight it carries, whereas the cargo ship will burn only about 23 lb.

Air travel is in some respects complementary to other forms of transport ; but in others it is competitive. Perhaps the best analogy as regards air and surface transport is the co-existence of the telegraph and the postal services. The one was developed later than the other, and represents a much speedier but also far more expensive service. It supplements but does not replace the older service.

The provision of public transport services did not, it must be remembered, dominate the development of civil flying from 1919 to 1939. Numerically the most important class of aircraft was the light aeroplane for both private and club use, and the development of club flying was fostered and subsidised by the Government to provide a supply of pilots in the event of war.

But the immense development of aircraft design during the second World War (aircraft manufacture in 1944 employed nearly 2,000,000 workers and was the largest single industry in the country) makes a tremendous expansion in commercial flying inevitable in the near future. The important question will be the forms of organisation which are evolved.

The organisation of air transport, with its superficial similarity to sea transport, might lead to a natural expectation that it would be highly flexible and competitive. In effect, however, the most successful and permanent air lines have been limited and protected monopolies, established in the majority of cases under Government auspices. This is due to the fact that, save in a few rare instances, air transport does not

normally cover its private costs either for freight or for passenger transport.

In 1938 overseas air lines were controlled by two companies: Imperial Airways Ltd., serving the long-distance Imperial routes, and British Airways Ltd., handling part of the Continental traffic. Both of these Companies received a direct subsidy, conditional on the executing of mail contracts. In 1940 these two Companies were, by Act of Parliament, merged into the British Overseas Airways Corporation. The railways, through their associated company, Railway Air Services Ltd. and other interests controlled about 70 per cent of the inland air mileage, until in 1946, the Labour Government, as a first instalment of its policy for the nationalisation of transport, took over the railway-owned air lines and placed them under the British European Airways Corporation.

§ 6. *Private Tracks: Canals.* One of the most obvious improvements, for a nation accustomed to send goods by water, is to get rid of the disadvantages attendant on river navigation. The first step, when adequate capital is available, is to dredge to a constant depth, make short cuts, and build locks and weirs to preserve a good depth of water and avoid rapids. The second method is to build an artificial river, following a planned route, free from swift current, of uniform breadth and depth—in short, a canal. Such a waterway can be almost an ideal highway for heavy goods transport. It has every qualification except speed. Despite the popular opinion that canals represent an out-of-date method of transport, the network of waterways in the east of France, with barges towed by electric locomotives, is

one of the most comprehensive and economical systems of inland transport in existence. Britain has suffered the usual fate of the pioneer as regards canals, but she possesses at least one outstandingly successful waterway worked on a unique method. The Aire and Calder Navigation employs a special system for the transport of coal. Instead of the usual "monkey boats," or characteristic canal vessels, square, box-like units or "compartment boats"¹ are employed, a score of which can be closely coupled together like the trucks of a railway train, and hauled by a powerful tug.

The canal, of course, has certain drawbacks. The need for uniform breadth and depth means that the standard of construction cannot be varied to suit the traffic, if through carriage is desired. There can be no gradients to suit the contour of the country: changes of level must be effected through locks, which are costly, slow in operation and wasteful of water. Even if, as James Brindley believed, rivers were created "to feed navigable canals," constant changes of level produce an intolerably "thirsty" canal. The road avoids most of these drawbacks. It can wind over the mountain-passes; it can be constructed to any width to suit the traffic; there is no arbitrary technical limit to speed. Unfortunately a horse can drag on a road much less weight than it can tow through the water, and the bogey of friction severely limited the use of roads until, on the one hand, mechanical propulsion, and on the other, pneumatic rubber tyres, were developed.

§ 7. *Railways.* The era of transport which was inaugurated by the first steam-operated railways was

¹ Known locally as "Tom Puddings."

in many ways different from any previous epoch. Railways had unique technical qualifications ; for they combined with the ability to transport very heavy loads at a small cost in energy, a capacity for very high speeds at a not prohibitive increase of energy. A horse could draw on a rail many times the weight it could draw on the road. On the Surrey Iron Railway soon after the nineteenth century opened, a horse drew a train of over fifty tons a considerable distance,¹ whereas the former draught of a horse on a good road had been considered to be about three-quarters of a ton. By changing from horse to locomotive power, both the speed and the load on the rail could be raised almost indefinitely. By canal, speed was severely limited, any increase producing erosion of the banks and a risk of flooding, while the delays at locks would always prevent the overall journey speed from being high.

The happy combination of something of the canal's economy of effort in moving heavy loads, with a smaller and more convenient unit of conveyance, and unlimited potentialities for speed, gave railways the unique position which they occupied for nearly a century. Moreover, a profound psychological change accompanied these technical advances. Rapid transport seemed almost a thing desirable in itself, as a symbol of progress. It became agreeable to reach York from London in six hours, instead of three days, quite irrespective of whether the additional sixty-six hours could be put to any better use than in travelling. Some English towns petitioned for a railway regardless of whether their inhabitants had many goods to receive

¹ F. S. Williams : *Our Iron Roads*, p. 6.

or consign, or any reason for travelling. Others of course took the opposite view, and endeavoured to keep the railway stations remote from the centre of the town ; an attitude which may have been influenced by the vested interest of the local carriers in some cases.

Estimates of the traffic likely to pass over new lines were necessarily vague, being based either upon pure theoretical speculation or else upon surveys of the actual receipts from coaches and carriers. The degree to which the provision of facilities would itself create traffic was seldom appreciated.

The railways embodied another new principle. Hitherto the provision of a track had not implied the provision of transport. The turnpike trusts did not run coaches ; the canal companies, for the most part, did not run canal boats.¹ But the railway embodied a totally different conception. It provided the highway ; and it was the sole transporter.

This was not realised for some time after railways became common. As an English judge remarked : " The notion of the railway being a highway for the common use of the public, in the same sense that an ordinary highway is so, was the starting point of English railway legislation." Monopoly, it was believed, would be non-existent since competitive carriers would run engines and trains over the railways. In 1838 a Select Committee of the British Parliament recommended in

¹ The British canal position was somewhat complicated. Canals were not allowed by law to operate barges (the Duke of Bridgewater's was apparently an exception) until the Act of 1845. Small carrier companies, occasionally large ones, such as Messrs. Pickford & Co., were the usual operators. In some cases the unit might be a single barge, owned and operated by one family. In others manufacturers with wharves alongside the canal operated their own boats to carry their goods.

its report that the Post Office should be given the power to run engines and trains of its own and not be liable to toll payments. This did not become law; but there were a few cases of the operation of private rolling stock. The Stockton and Darlington railway, although it carried merchandise by its own trains from the start, for some years left its passenger traffic to stage-coach proprietors who, on payment of a toll, were allowed to run horse-drawn coaches fitted with flanged wheels along the railway line. There is also one recorded instance of a trader who ran a private locomotive on the Grand Junction Railway to draw his own coal.¹ Another enterprising individual hired a train, complete with locomotive, from the London and South Western Railway, and operated it profitably at very low fares for some time, until the railway company realised what was happening.²

Early British railway legislation was completely imbued with the idea that the railway was essentially a privately owned highway for public use. One Act gave neighbouring landowners the right to have sidings built connecting with the main line—not, as might be imagined, for the collection and delivery of their traffic by the railway's trains, but to enable their own locomotives and rolling stock to pass on to the railway line. The practice was extinguished, partly owing to the increase in speed which made it imperative to bring all trains under a single control; partly owing to the fact that the railways discovered that the clauses in their Special Acts requiring them to give access to the line, on payment of the appropriate tolls, to any owner

¹ E. A. Pratt: *History of Inland Transport*, p. 260.

² Sam Fay: *A Royal Road*, p. 44.

of a locomotive, did not also require access to be given to the companies' stations, watering-cranes, etc. or, the provision of facilities for operating the signals and points. A trace of this early practice lingered for generations in the survival of private owners' wagons on British railways, chiefly in connection with the coal trade.

The separation of the highway from the haulage function was carried a stage further in law, if not elsewhere. The legal dictum already quoted went on to lay down three possible arrangements for a railway. "The company might be merely the owners of a highway, and toll takers for the use of it by other people with their own carriages and locomotives." Or under "a second state of things . . . the railway company provided the line, and provided the engines and trucks, but they were not carriers. The large warehouses and sheds wherein goods were received, sorted, loaded, covered, checked, weighed and labelled, and trucks and carriages marshalled . . . the staff . . . necessary for these operations were all provided and maintained at the expense of the carrier, and no portion of it fell upon the company.

"The third state of things . . . existed where the company themselves were the carriers of the goods."

In the early days in England, according to eminent authority,¹ there were three systems, corresponding to the learned judge's outlined arrangements, in force on English railways. "(1) The London and Birmingham Railway did not collect or deliver goods, this work being performed by carriers such as Pickford and Co., and Chaplin and Horne, fifteen such firms acting as carriers

¹ *Modern Railway Administration* (Gresham Publishing Co.), Vol I, p. 160.

on this system in 1840. (2) The Grand Junction Railway between Birmingham and Liverpool and Manchester, both acted as carriers and allowed carriers to use their line. (3) The Liverpool and Manchester Railway acted as carriers, performing the service of collection in Manchester."

It was some time before the distinction between the carrier and the transport agency disappeared. On the London and South-Western Railway, for instance, the company did not undertake the carrier's functions until 1853. In various parts of the Continent *spéditeur* organisations still perform the duty of carriers, employing the railway to convey the goods they receive from and deliver to the public. While there is nothing to be said in favour of separating the provision of a railway from the provision of motive power, the success of certain *spéditeur* organisations does suggest that the specialised work of forwarding and receiving agent may sometimes with advantage be disconnected from the actual business of conveyance.

§ 8. *Carriage and Distribution.* The two functions of conveyance and distribution are generally in joint demand. Admittedly raw materials and semi-finished articles may travel in bulk from start to destination; but ultimately the products into which they are worked up, the final "consumers' goods," will require distribution among the population. Even the transport of capital goods, such as steel girders to be used in constructing a factory, will, when the factory starts producing, involve a demand for distributive transport.

The qualifications of any single agency are frequently unequal in respect of transport and distribution.

Certain natural alliances are thus formed which profoundly affect the organisation of transport. For many years road and rail have been regarded as fiercely competitive; but less attention has been given to the extent to which they are naturally complementary. A railway can only effect final distribution to firms actually connected with the rail by means of a private siding. For other customers, including all passengers, it must work in conjunction with a road system at each end of the rail journey. One of the very first effects of the growth of railways was an increase in the use of roads for short-distance carriage. "The railways were fed, in the jingle of the nursery, by 'coach, carriage, wheelbarrow, cart' . . . Carts and cabs increased," even though, at the same time, "coaches and posting-houses decayed."¹ It is not always realised that the railway did not kill road traffic, it directed it into new channels. Few of the stage-coach proprietors who lamented the passing of their trade, understood this. There was one exception—William Chaplin, who had the rare foresight to sell his coaches at the beginning of the railway era, and with the proceeds founded the firm of Chaplin and Horne—forwarding agents for the London and Birmingham Railway.

The cost, delays and breakages incidental to transshipment lead certain firms to construct factories at ports, in close connection with the docks. While the concentration of terminal services and final delivery is a convenience from several points of view, including the compilation of trade statistics and Customs adminis-

¹ J. H. Clapham: *Economic History of Modern Britain—The Early Railway Age*, p. 403.

tration, it leads to congestion which may have adverse effects upon efficiency. If and when aeroplanes become extensive freight carriers, no doubt a similar problem will face firms which utilise air transport. At present, of course, while the air has high qualifications for rapid carriage of perishable goods, etc., its distributive efficiency is very low.

A discrepancy between relative capacity for carriage and distribution is generally due to inelasticity in the unit of conveyance. In this connection the railway has unique claims, since its distributive unit is the wagon but its unit of transport the train. The variation in the size of wagon is limited, although even on the standard (4 feet 8½ inches) gauge it can vary from the British four-wheeler with a capacity of between 10 and 20 tons, to the American 100-ton coal car of the Virginian Railroad. But the secret of the railway's economy lies in the use of trains rather than unit vehicles, although the effort to meet road competition has already induced the adoption of unit self-propelled railcars and may produce self-propelled unit freight wagons for small consignments requiring rapid delivery. By combining vehicles in trains an economy in carrying heavy loads is achieved without sacrificing distributive efficiency, which is unfortunately the case when economy is achieved in ocean transport by the use of a large cargo vessel, since transshipment is necessary at each end of the voyage.

Turning from the vehicle to the highway, it is obviously important, if distributive efficiency is to be high, that spurs or feeders can be constructed as adjuncts to the main line at a relatively lower cost per mile. From this point of view, while railways are perhaps more fortunate than canals, they are distinctly

less well placed than roads. The cost per mile of roads can be adjusted in strict accordance with the traffic expected, since road vehicles do not normally require heavy earthworks in order to provide easy gradients. No doubt the high standards of construction required by the State in England, for even the smallest branch line, added to the natural difficulties of railways in serving light traffic requiring a high degree of distributive services; but even in the most favourable circumstances railways could never emulate the capacity of the road system, which connects with practically every house in the United Kingdom.

§ 9. *Urban Transport.* Urban passenger transport presents a special problem. The organisation of road traffic—isolated vehicles, travelling on a narrow track but not marshalled, as on railways, into streams which cannot conflict—indicates a very definite saturation point. There is thus a paradox; that although there is a general tendency for railways to be superseded by road transport over short distances, for purely urban traffic it may be necessary to return to the railway, either surface or underground, and electrically worked, as the only agency capable of handling the volume of traffic. Such has been the experience of London, Paris, Berlin, Moscow, New York and other cities. The capital cost of such urban railways is usually very high, so that despite a high operating efficiency they may be—since the level of fares is dictated by the costs of surface road transport—and often are unremunerative. The London Tubes and the New York Subways are definitely unable to cover their capital charges in full. Technically these urban railways combine the efficiency of the

train as a bulk transporter, with a high distributive efficiency arising from stations situated at short distances apart and lines closely following the main road traffic routes. The limiting factor is thus not the speed which trains can attain between stations, but the distance between the street pavement and the station platform. Deep-level underground railways, or "tubes," are at a disadvantage in this respect which can only be minimised by the use of rapid escalators. There is also the psychological factor—the dislike of travelling underground felt by many people, the mental effort required to take a ticket and descend an escalator or enter a lift, as compared with the simple act of stepping off the pavement into a 'bus.

The electric tram combines some of the features of the urban railway and the omnibus. It has the characteristic economy of power which comes from the use of the rail; the vehicles are large and can be coupled together in short trains, which is frequently done in the United States and on the Continent; seldom in England, where the large double-decker is the commonest type. But it is not flexible enough to adapt itself to congested streets, which is the principal reason why it is being superseded by the motor bus or by the electric trolley-bus which draws its motive power from a central power house through an overhead wire, but is not tied to the rail. The electric tram, however, may survive in less densely populated areas, where it can run on special tracks alongside the road, built very cheaply, yet with some of the advantages of the railway type of organisation. Such "inter-urban railways" in the United States cover long distances, and even provide restaurant car facilities.

CHAPTER III

THE ORGANISATION OF TRANSPORT

§ 1. *Investment by the State.* Broadly speaking, investment by individuals takes place under such conditions that the last (i.e. marginal) unit of investment in each type of productive occupation will produce an approximately equal return. This does not of course mean that the money yield on all types of investment will be equal ; but only that when the element of risk and irregularity has been removed by deducting an insurance premium from the money yield, and also concealed repayment of capital (as in mining enterprises where the assets are wasting and cannot be renewed), there is a *tendency* to equality of returns. Indeed, the economist's vision of production as governed by increments of resources, applied at the margin of different activities, receives by far its best illustration through the working of the Stock Exchange. Workers drift into and out of different occupations frequently without any clear idea of what really causes their actions ; business men often have to take a " leap in the dark " ; but every day many thousands of investors are scanning the news and shifting the employment of resources at the margin—investing £50 here, withdrawing \$100 there—in such a way that there is a day-to-day tendency towards equality of returns. This of course does

not imply any variation in the resources at the command of different enterprises, since the Stock Market "marries" buying and selling orders by adjustment of price; but it becomes significant when an enterprise needs to raise fresh capital, as the terms upon which it can issue stock depend upon the returns to past investment. Returns above the average in any industry lead to extended investment by existing firms and the entry of new firms into the business, until the supply increases relatively to the demand sufficiently to cause prices to fall to a point at which net returns are no greater than in other industries.

But there are several ways in which this system of private investment may fail to produce the output which would be socially most desirable. On the demand side as has already been noted to apply strongly to transport there may be a discrepancy between consumers' effective demand and the aggregate social demand. On the supply side, the unit of investment may be inelastic, and thus a certain maladjustment may be inevitable. For instance, any railway built between A and B may have a capacity of at least 1,000,000 tons per annum, but the maximum anticipated traffic may be only 800,000 tons.

A distinction must here be made between private net returns and social net returns, which in practice often fail to coincide. In other words, the private net returns of one industry may be the result of its ability to throw part of its social costs either upon another industry or upon the whole community. In this case the private net returns are higher than the social net returns. Or investment in one industry may benefit other industries or the community in ways that receive no tangible

monetary expression in the returns to that industry. In this case the net private returns are lower than the net social returns. Simple instances of the former case are the brewing and distilling trades, part of whose social costs are the police and judicial expenses due to drunkenness ; or factories that emit smoke, part of whose social costs are comprised in the laundry bills of their neighbours. " Very little of an industry's smoke " —as an English economist has written—" gets into its supply curve " ; but it all gets into the nation's supply curve. A simple instance of the reverse tendency occurs when a tramway system is obliged to maintain the road surface between its tracks for the benefit of other road users.

Investment by private investors generally takes place in strict accordance with the anticipated private net returns to an industry. There are trifling exceptions to this rule, as when especially conscientious groups of investors refrain from holding brewery or armament shares, or invest in the construction of working-class dwellings and voluntarily impose a maximum dividend ; but they are of no practical importance. There is thus a *prima facie* case for intervention by the State to make investment correspond with social net returns. An example of such intervention in a negative sense exists when the State imposes specially high taxation upon the sale of alcoholic drinks or imposes fines for creating a smoke nuisance : in a positive sense when it grants an industry a subsidy or engages in production itself.

The extreme *laissez-faire* doctrine of non-interference by the State depends upon the assumption that social and private net returns are identical—that self-interest is equated with the common weal. This is only true

under conditions of completely competitive supply and demand; a perfect market, in other words, coupled with an absence of material inequality of incomes. Such conditions seldom exist. But the case for State interference in the direction of equating social and private net returns has suffered, in the popular mind, from association with attempts permanently to raise the returns to certain home industries at the expense of foreign industries, by means of protective tariffs. The case for a system of taxes and bounties or direct investment by the State in order to bridge the gap between social and private net returns, stands on a different footing.

We are only concerned here with one aspect of positive intervention by the State—namely, through investment in transport. It is clear from the foregoing that the object of State investment is to secure output of a kind whose social net returns are higher than its private net returns, and which accordingly tends to be less than it would be under ideal conditions. A railway, for example, may yield high prospective social returns, and yet, in a community chronically short of capital, offer lower private returns than other industries. The State may then find it advisable to invest the community's resources in railway construction. Where industrial development has proceeded slowly, and capital is scarcer than in the more commercialised nations, the State has frequently undertaken this task in the hope of stimulating the growth of new industries—this of course being another version of the "infant industry" argument in favour of Protection. In some countries State railways have grown alongside privately owned lines—as in France, India, the Argentine or

Brazil. In these cases output under private enterprise has been considered to fall short of the ideal, and the State has invested part of the community's resources in an attempt to reduce the maladjustment.

There is yet another factor. The price system cannot ensure the ideal output in circumstances favourable to monopoly. In these cases the State may, and often does, attempt to control output and prices so as to reproduce more nearly the levels that would prevail under competition. Such intervention in the case of inland transport, for instance, may be assisted by the fact that the monopolist must usually invoke the State's co-operation to secure the right of "eminent domain." But the extreme difficulty of determining a "reasonable" profit for a monopolist may lead the State to cut the Gordian knot and turn producer itself. There will thus be an end of the struggle between self-interest and the public welfare ; and it is in this hope that the State has invested largely in railways and canals in various countries.

There are, however, certain definite disadvantages and dangers attaching to State investment. We are not here concerned with the rather vague accusations of "civil service methods," "bureaucratic red-tape," and so on, which are as likely to be characteristic of private monopoly as of Government operation. The proof of such criticisms can only be inductive, and based upon elaborate comparisons.

The chief theoretical danger is that the apparent returns to State enterprise may not coincide with the true social returns through incorrect accounting methods. For instance, if a municipality builds a tramway system, and borrows for this purpose, it is likely to

raise money at a lower rate than a private company in the same circumstances could, since it can charge the tramway debt upon the whole of its assets and the rate fund, while the company could only offer its own assets, i.e. the tramway. Before the municipal trams can truly show a profit, they should be charged with a payment to the ratepayers to cover the use of the special security. A more obvious distortion arises when a tramway company is obliged to maintain the road space between the rails at its own expense, while a municipal system may charge this expenditure to the road fund.

It is clearly too much to expect that a balance shall be struck with complete impartiality and with a view solely to the social costs of the two systems, when the State operates its own transport alongside or in competition with a private system. It is a lawsuit in which the judge is also a litigant. In those countries where State railways exist, it is noticeable that the control of road transport is more drastic, as a general rule, than in countries such as the United States, where the railways are in private ownership. And where private transport undertakings operate under a concession from the State or the municipality, opportunity has often been taken to impose specially onerous conditions for the benefit of the ratepayer or taxpayer, or sectional interests. Tramway companies in London were required to carry out street improvement schemes which had little relation to the actual traffic requirements of the tramway, or to make a capitalised payment in advance for "wayleaves" to the local authority. Under these circumstances the true social costs of the undertakings were obscured and investment (probably) fell short of the ideal amount.

Road construction by the State is a special case. To some extent the difficulty of charging for use has prevented private enterprise from entering the field of supply ; but by far the most potent force has been the traditional vesting of the road-making function in the central or local organs of government. A certain minimum of internal communications is a condition of the existence of any State, even a feudal one. The services of justice and defence, the levying of taxes and the transport of news are almost impossible without a road system.

The extent to which the State will find it possible or advisable to devote resources to road construction cannot be laid down in advance. The price system provides no shibboleth. It might be said that the State will endeavour to construct roads which are adequate to carry the traffic offering without congestion. In the days of railway supremacy this was no doubt largely true. The use of the roads for profit was small relative to the private use. Long journeys were uncommon, so that there was an element of rough equity in charging for roads, as in England, by means of rates levied upon local residents in direct ratio to the value of property ownership. When "gainful use" became more and more important, with the extension of mechanical propulsion, this simple test became inadequate. Moreover, a policy of building roads to suit the traffic offering involved reasoning in a circle ; for the traffic was a function of the road facilities, the taxes imposed on motor vehicles by the State and the conditions (again largely dictated by the State) under which competitive agencies such as railways were allowed to work.

The ideal quantity of roads may be defined as the

quantity necessary to carry without congestion such a volume of motor traffic as would be produced by perfect competition¹ among road carriers and also between road and rail—each competitor covering his full social costs. It goes without saying that we cannot use this as a practical guide. Competition between road and rail can never be perfect ; nor can the true costs (since the full capital cost of roads, originally constructed many hundreds of years ago, is buried in the dust of ages) of road transport be ascertained. Moreover, roads retain their important non-commercial uses.

It may be noted that attempts have been made, with varying success, to relate charges directly to the use of the roads. In Britain, when wheeled traffic such as stage coaches and carriers' carts grew to importance, the finance of main roads was handed over to turnpike trusts, admittedly monopolistic, but in theory returning their surplus to the community by way of reduced tolls. In Italy a similar solution was sought by the construction of *autostrade*—privately owned roads reserved for toll-paying motor traffic, with a concession reverting after a term to the State. But owing to the practical disadvantages this system is not likely to become universal. The simplest method is also the commonest—making a charge related only to the *probable* use of or damage to the roads. This is the usual method of charging householders for water supply, the estimated consumption being deduced from the rateable value of the house.

¹ "Perfect competition" is here used in the technical sense : no individual supplier being sufficiently important to influence price by adjusting that part of the supply for which he is responsible.

§ 2. *Private Investment.* There are two conditions which must be fulfilled before private investment can take place. A community must be able to release physical energies from producing for current consumption; and there must also exist a financial or other mechanism for mobilising the resources thus set free. When the volume of available resources was but small, investment in transport took place only in those agencies with a flexible unit of capital outlay. Ships probably represent the most flexible form of transport investment, and from time immemorial capital has been invested in trading voyages; it is a commonplace that the Greeks of the classical period practised marine insurance.

In the first instance there was no separation of the business of carrying goods from that of selling them. A single merchant, or a group forming a syndicate or partnership, would invest in a trading "venture"—i.e. a ship and cargo—which was wound up when the voyage was completed and the cargo sold. This system survived until comparatively recent times. The American merchant traders of the late eighteenth and early nineteenth centuries have been thus described.¹ "Those old Salem merchants were shipowners, and something more. They did not, as a rule, carry freight for others. When Mr. Derby or Mr. Gray or Mr. Peabody built a ship he calculated to use it in his own mercantile ventures. He would furnish it with an outward freight, and the sale of this procured a homeward cargo, which the merchant would dispose of from his own warehouses."

The change from the private to the public carrier has

¹ W. L. Marvin: *The American Merchant Marine*, p. 198.

been a slow process, at any rate as regards sea transport. The closest historical parallel to the large shipping concerns of the present day can be found in the great trading companies which pioneered colonial development. These concerns operated an extensive transport system as a necessary appendage of their merchanting function. The British East India Company ran its own armed vessels on regular services to India and anticipated the Liner Companies of a later date. Investment in transport had been characteristic of the Hanseatic League and the great Chartered Companies; the international merchant firm of Fugger developed its own system of posts across Europe. Even a purely financial organisation such as the house of Rothschild in the early nineteenth century found it profitable to provide its own relays of messengers and its own sailing packets for the rapid transport of news and of value. Of course these private systems were often used, by permission, by people on good terms with the merchant houses, or by State personages in a hurry; and in some cases they assumed a semi-public character.

This type of investment in transport—by producers or merchants for whom it is ancillary to their main business—has never ceased to be of importance. Manufacturers and traders operate their own steamships and railways, their own canal boats and (to an ever-increasing extent) their own road transport vehicles. Something like 80 per cent of commercial freight vehicles on British roads are the property of “ancillary users.” The United Fruit Company in America, through its subsidiaries, operates nearly one hundred steamers on freight and passenger ocean services, and ranks as one of the largest shipping concerns. The United

States Steel Corporation, also through subsidiaries, owns or leases 4000 miles of railway.

Direct investment in public transport (i.e. carrying for the account of others) was restricted, until the general extension of limited liability, to business men. Even the ownership of a single ship implied the possession of considerable means. A system of partnerships formed to obviate this difficulty involved the conventional division of ships into fractions up to sixty-four shares. The "sixty-fourth" ship was a common type in the latter part of the nineteenth century. However, when limitation of shareholders' liability for the debts of the company was conceded without the necessity of obtaining a private Act or charter, the joint-stock company became prominent in transport as in other businesses. Companies were formed to operate both liners and tramps. Similarly, in road transport, where public carriers (such as the celebrated Hobson on the London-Cambridge road) had previously operated with their own capital, it now became possible to attract the savings of the general public. But as it happened, neither at sea nor on the roads has the capital of the ordinary investor been widely employed, although of course the great statutory undertakings such as canals and railways were from their early days favourite investments for the *rentier* class.

It is sometimes difficult to realise how narrow a field was offered the British investor in the eighteenth century, assuming him not to be a business man. He could invest in Government securities, the "Funds"; he could buy the stock of a select few statutory companies which normally paid regular dividends; he could place

his money out in private mortgages through an intermediary ; but participation in the ordinary risks and profits of business was denied him unless he entered a partnership and incurred unlimited liability. The ancestor of Galsworthy's Forsytes, seeking a safe 5 per cent, had a harder task than his descendants. It would seem that the pressure of accumulated capital seeking an outlet was responsible for waves of speculation such as the "South Sea Bubble" and the excitement attending Government lottery loans in the eighteenth century. When the rise of canals and, later, of railways appeared to promise good profits coupled with the protection of limited liability for the timid investor, the tide of capital reached its flood. Three times it burst its banks, in the British "canal mania" of 1791-4, and in the two "railway manias" of 1836-7 and 1845-6, when the ordinary investor followed where the "men of enterprise" had led.

The first British commercial canal was built by the Duke of Bridgewater mainly from his private means¹: the early railways were constructed by North-Country business men for their own trading needs. But when it was seen that limited liability was coupled with the prospect of good dividends, what Professor Clapham has called "blind capital" poured into every new enterprise. Over-investment followed, both in canals and railways ; the spate of money encouraged the promotion of unnecessary, unsound and even dishonest schemes. Even the good projects, the great trunk lines of communication which have fulfilled the purpose for which they were designed, were highly capitalised at the start. The level of legal and Parliamentary costs,

¹ He was obliged to borrow on mortgage to complete the work.

the price of land and the hidden blackmail levied by influential landowners, are a familiar part of British railway history.

It is curious to reflect that despite the initial wave of speculation railways in England gradually became the most conservative of investments, ranking second only to Government stocks in popular estimation. The reason for this must be sought in the widespread amalgamations and absorptions of the first half of the railway age. In most industries there are certain favoured firms earning and paying high dividends on their capital, some making a small profit, and others on the margin of existence. Railways were no exception ; but the struggling lines which had never paid a dividend were incorporated in the more prosperous concerns. Economic Darwinism—the survival of the fittest and the elimination of the marginal producer—had less part in railways than elsewhere. Thus the modest 6 or 7 per cent dividend on the ordinary capital, sometimes quoted by railway historians as evidence that there was no abuse of a monopolistic position, was really an amalgam of the earnings of trunk lines with a strongly entrenched monopoly and those of competitive routes or unsuccessful branches.

The problem in the United States was different. The primary need of a new country, developing fast, chronically short of capital for long-term investment, was to get the railways built by hook or by crook, not to prevent unnecessary ones from being constructed. In order to attract the investor by an appearance of greater security, railway capital was offered to a greater extent than in England as bonded debt. Many lines were constructed almost entirely upon loan capital. Frequently

State assistance was forthcoming, usually in the shape of free grants of land, in order to encourage construction. The toll levied by British obstructionists or opportunists was almost entirely absent. The capitalisation per mile was much lower, partly for these reasons, and partly because the standards of construction appropriate to a country such as England were unnecessary in a land where the railway was built to create traffic.

The high ratio of debt to share capital had another effect in the United States. A relatively small fluctuation in net revenue would produce a relatively high fluctuation in the rate of dividend earned on the common stocks. The latter thus tended to be more speculative than their British counterparts. Moreover, since voting power normally resided only in the common shareholders, the low proportion which this stock bore to total loan and share capital made it easy for outside financial interests to secure control without necessarily subscribing for or purchasing a majority of the total capital of the concern. The financial dictatorships of the United States were thus enabled to acquire vast systems without effecting complete amalgamations or making such immense cash outlays as might be expected at first sight.

§ 3. *Ownership and Control.* Adam Smith, in a well-known passage, declares that the joint-stock form of organisation is unsuited to business in general, with the exception of those businesses in which routine plays a large part, such as insurance or canal construction. There were, and still are, good *prima facie* grounds for this assertion. One man, or a partnership of business

associates, can make bold and rapid decisions in a way impossible to a large general meeting of stockholders, most of whom know little of the business in hand. The division of ownership among many hundreds or thousands of investors would lead to a confusion of policy, if control were not separated from ownership. The problem did not arise before the growth of the large-scale joint-stock company. The trading venture, or the "sixty-fourth" ship, was normally the property of business men; and even here there was generally a division of functions, one man or firm leading the consortium. "It was a fairly common practice for people having business relations to arrange for the building of a ship to be managed by the one who had most experience of freight and shipping business generally. The others, in addition to their share of the profits made by the ship, would, if in a business connected with the repair or the equipment of shipping, do that part of the ship's business for which they were competent."¹

Such an organisation could not be applied to large-scale canal or railway construction. It is, however, interesting to note that for the British turnpike system a form intermediate between the partnership and the large joint-stock company was adopted. The charge of a given stretch of road would be vested in trustees—generally local landowners—who were authorised to raise loans for road construction or repair, and charge current maintenance and debt service upon the tolls. The trust was thus theoretically a non-profit-making body, paying interest upon its loan obligations in the hands of the public, but employing surplus receipts, above interest and maintenance charges, in redeeming

¹ A. W. Kirkaldy: *British Shipping*, p. 169.

its loans and gradually reducing its tolls. It was thus the forerunner of the semi-socialistic Public Corporation to which in many cases has been entrusted the supply of water, electricity in bulk, and transport.

The turnpike system in England broke down upon the question of control. The trustees were often incompetent, and the tolls frequently had to be farmed out to contractors. The element of profit thus entered what should have been a public utility returning all surplus to the public. One contractor, Lewis Levy, is supposed to have farmed nearly half a million pounds' worth of tolls annually within sixty to eighty miles of London.¹

It was in canals and railways, however, that the question of ownership and control in large-scale joint-stock undertakings was first resolved. Adam Smith's criticism was rendered invalid by the gradual vesting of authority in the Board of Directors, and its abrogation by the shareholders save in times of crisis, when, indeed, the activity of the General Meeting frequently tended to hamper the directorate. Such a development was bound to follow the entrance into railway investment of the general public, the widows and orphans who are popularly supposed to be the exclusive prey of the fraudulent company promoter. The Quaker business men who founded the Stockton and Darlington Railway were succeeded, as the "mania" developed, by the *rentier* proper—the class with savings, but neither the energy, the knowledge nor the inclination actively to oversee their employment. There are surprised contemporary references in British railway history to the

¹ E. A. Pratt: *History of Transport and Communications in England*, p. 318.

number of clergymen who were railway shareholders—apt in moments of great stress, such as the passing of a dividend, to address the General Meeting as “ dear brethren.”

Control did not pass from the hands of this new class of shareholder entirely without a struggle. Unaccustomed to the risks of enterprise, brought up on fixed interest Government securities, the investor invariably became vocal if a dividend were reduced. Stormy scenes took place ; Boards were overthrown ; and on one occasion at least a seceding body of shareholders, unable to get their way constitutionally, elected a rival Chairman and directors, forged a version of the corporate seal, and negotiated agreements and conducted business in the Company's name. On another occasion a chairman was held down in his seat by force while a number of resolutions to which he was opposed, and to avoid which he had declared the meeting adjourned, were passed. The meteoric career of George Hudson, the English Railway King, illumined these struggles. Shareholders and Boards alike followed his lead, until his method of enhancing the value of stocks in weak companies, by inducing a stronger company to guarantee a dividend, finally collapsed. After his disappearance from the railway scene the gradual process of amalgamation and expansion eventually solved the problem of control by transferring it almost entirely to the directors. Two factors contributed to this result. In the first place, the policy of amalgamation, by taking the weaker in with the stronger, smoothed out the more violent fluctuations in profits. Railway shares lost much of their speculative character ; and investors receiving a steady 5 per cent are less likely to be active

at meetings than those with a faint hope of 10 per cent and a lively fear of nothing. In the second place, the increase in size meant an increase in the number of shareholders in each undertaking. Only a small proportion of these had the time and the inclination to attend meetings; of those who attended, few had definite opinions upon policy or could command votes. After the middle of the nineteenth century the capital of the main lines was so large that no ordinary group of financiers could command a voting majority. Control was tacitly left to the directorate, a small body, in theory elective but actually co-opting members to fill vacancies in a purely oligarchic manner.

If the government of British railways was aristocratic, that of the United States lines was generally Cæsarian. The great financial interests of Vanderbilt, Gould, Harriman and Hill controlled enormous networks of lines through chains of holding and subsidiary companies. This monarchical regime was facilitated by the preponderance of bonded debt as the typical railway investment. A holding company need only possess 51 per cent of the common stock of a subsidiary, which might have many times that amount of debt in the hands of the public, to have effective control and ownership. Control, moreover, could often be achieved without ownership, through the latter being in the hands of financial associates.

In theory the bondholders might be able to obtain possession of the line if the interest was in default; but in practice this meant little. Application might be made by a small group of bondholders in league with the controlling financial interests for a receiver to be placed in charge; the application would be made

before a sympathetic judge who would appoint either the existing manager or some other interested person as receiver and thus the genuine bondholders would still be without redress. In England it was realised early that earning capacity is the only specific security of the railway debenture-holder, and since 1867 this class of shareholder, or rather mortgagee, has had no power to foreclose upon or dispose of the railway's assets, although the whole of the net earnings must be available to satisfy the claim for interest.

Where transport is in public—State or municipal—ownership, the problem of the relation between ownership and control equally requires to be settled. Transport may be operated by the State as a government department in the same way as the Post Office is a department of State. Municipal tramways are usually under the administration of a Tramways Committee of the municipality, similar to the committees for street cleaning and lighting, poor relief, etc. In some countries the railways are administered by a company—e.g. the Canadian National Railway Company, or the Deutsche Reichsbahn Gesellschaft—in which the State is the only, or the controlling, shareholder. Within the broad limits of these forms of organisation, ownership and operation may be separated by leasing concessions to work the lines by private enterprise. In Italy practically every variation has been tried; as Sir William Acworth remarked,¹ that country “has tried State ownership and operation, private ownership and operation, State ownership with private operation, and at last in 1905 it reverted to both ownership and operation by the State.”

¹ *State Railway Ownership*, p. 18.

As a result of lengthy experience, it is now generally accepted that public ownership yields the most favourable results when combined with management on mainly commercial principles. The tendency is thus to turn publicly-owned transport systems into independent organisations on the lines of commercial concerns on the co-operative principle. The community, or the users of transport, share in the divisible surplus, but do not usually have a voice in the management.

There is a frontier territory where private and public enterprises meet. In various countries railway concessions have been leased to companies authorised to construct and exploit railways for a definite period, at the end of which the lines shall revert to the State, either with or without compensation. A similar situation existed with regard to tramways in Britain. These were introduced at the apogee of *laissez faire*, and at a time when the permanent concessions obtained by monopolistic private gas and water companies had become unpopular owing to alleged high rates charged by these entrenched monopolies. Accordingly, the Tramways Act of 1870 established a right of veto on the part of local authorities and frontagers; an original length of concession of twenty-one years; and a right of purchase by local authorities at the expiry of this period or subsequently at the "then value" of the undertaking, i.e. the break-up value of the surplus assets excluding goodwill or a capitalisation of estimated profits.

The effect of this provision was that fares were calculated so as to amortise the capital, apart from the break-up value of surplus assets, within twenty-one

years ; while towards the end of the concession period all forms of expenditure of a capital nature were eliminated and the efficiency of the line suffered accordingly. When electric traction was introduced, moreover, the companies were in no hurry to embark upon the very considerable capital outlay involved by conversion from horse traction, under the uncertain conditions of their tenure. The only method of securing the conversion was frequently for the municipalities to purchase the tramway assets and install the electric plant. Here another complication arose. The Act of 1870 had empowered local authorities to own but not to operate the trams ; and so special powers had to be secured by Special Acts of Parliament before they could do so, until the disability was removed in 1896. Where private concerns were willing, given reasonable security of tenure, to change to electric traction, the municipalities held the whip hand owing to the legal position, and dictated the terms upon which the new concession would be granted—according to their critics, in an arbitrary manner which often involved the private companies in relieving the ratepayer of expenditure on road-surfacing or widening, and so forth.

Controversy always raged over whether the municipal tramway system should aim at a profit, so as to relieve the rates ; or at cheap transport, assisted from the rates if necessary. Frequently the matter was settled for the local authority in question by the nature of the demand. But a very unsatisfactory situation was liable to arise when in recent years private omnibuses began to compete with municipal trams ; the bases of economic competition were non-existent in many cases, since either the trams might be subsidised

from the rates during a war of fares, or restrictions upon the omnibus system might be applied in order to preserve the value of municipal tramway investment.

This problem has been settled in London by bringing privately and municipally owned undertakings under single control. The London Passenger Transport Board, it may also be noted, solved the question of ownership and control by abandoning even the outward symbols of shareholders' authority. It issued fixed or maximum interest-bearing securities, and devoted surplus revenues to redemption of capital and improvement of services. It had power to fix its own level of charges, and apart from the elimination of the profit motive or "equity interest," was organised as a large-scale commercial enterprise. The stockholders had no voting rights, although in the event of interest not being forthcoming for a stated period, they could appoint a receiver. In the original scheme put forward by the Labour Government, the executive heads, the members of the Board, were to be appointed by the Minister of Transport; but the National Government which took office before the Bill became law instituted a panel of non-political Appointing Trustees. In this case the wheel came full circle; ownership and control were completely divorced and the members of the Board could make their decisions as independently of shareholders' control as the smallest entrepreneur working with his own capital. By limiting the Board's responsibility towards the stockholders to the provision of a fixed net revenue, it was hoped that it would be easier for it to meet its wider responsibilities to the travelling public and its own employees.

There is another form of semi-monopolistic undertaking connected with transport where, in Great Britain, municipal operation tends to be superseded by *ad hoc* boards or public trusts. Formerly the control of harbours and rivers formed part of the royal domain, and the right to levy dues was often granted to local authorities by Royal Charter. But when, in the early nineteenth century, docks began to be required for shipping, companies were formed to undertake the necessary capital expenditure, deriving their revenue from tolls and dues. Certain important cities, notably Liverpool and Bristol, constructed their own docks; while there are numerous examples of railway-owned docks, the chief among which is Southampton. When, about the middle of the nineteenth century, complaint of high charges in privately owned docks arose, the method of redress was not through transfer to the municipality, but by creation of a public trust. The most important of these *ad hoc* bodies are the Port of London Authority, the Mersey Docks and Harbour Board (successor to the Corporations of Liverpool and Birkenhead as dock owners), and the Clyde Navigation Trust. The Balfour Committee on Industry and Trade estimated in 1928 that at least 70 per cent of the value of Great Britain's foreign trade is handled in docks under the administration of these public trusts. But it should be noted that there are variations in the connection between ownership and control as between the different trusts. The Port of London Authority owns and operates all of its undertaking, having its own railway lines and rolling stock, its own road vehicles in which it collects and delivers goods from and to consignors and consignees; it also employs a good deal of the labour required for

discharging vessels. On the other hand, the Mersey Docks and Harbour Board "as a dock owner limits its activities to providing facilities and leaves to ordinary commercial enterprise the utilisation of these facilities," in the words of the Balfour Report. The public trust, in short, was adapted to forms of enterprise which involve a strong element of monopoly and where public ownership and control, if not public operation, is desirable.

§ 4. *Combination and Large-scale Enterprise.* Transport undertakings show a greater variation in size than almost any other type of business. At one end of the scale is the one-man lorry business, or the partnership operating a single tramp steamer; at the other the giant shipping firms, or the vast nationalised railway systems. The principles which govern growth are accordingly of exceptional interest especially since there seems to be no "normal" size at which transport concerns tend to stabilize themselves.

It was mentioned in the last section that although the joint-stock limited company has become important in transport organisation as elsewhere, investment by the general public has come relatively late except in canals and railways. Shipping and road transport firms alike have generally expanded, in the first place, by reinvesting past profits in the business rather than by appealing to the investing public for capital. The characteristic "tramp" shipowner, for instance, was and remains a man of enterprise and experience, working a trade where judgment and far-sightedness have

more than usual importance. Established semi-monopolies have almost always existed at sea on certain routes, but the rank and file shipowner was of the "tramp" class, quick to discover freights, competing in a close market. The operation of a large public company is often unsuited to this type of work, though a successful private owner would make large profits for himself and have enough over to increase the scale of his operations. In the liner trade, however, to which some of the smaller concerns eventually graduated, earnings are more stable, and management more conservative; thus borrowed capital can be employed to better advantage.

Very similar conditions prevail in road motor transport. When the internal combustion engine was sufficiently developed it became possible to enter the business of carrying goods with a very small initial investment, building up the business by reinvesting profits. The qualities necessary for success were largely similar to those required in the tramp shipping industry. The lorry, like the tramp steamer, often competes for freight under, it has been said, "conditions of almost classical simplicity." Operated under rule-of-thumb methods it would go anywhere and carry anything that would pay freight in excess of prime cost. On the other hand, for passenger road service, even on the smallest scale, it was necessary to build up a quasi-monopoly or "goodwill" through regular and punctual service. But the scope for enterprise was equally wide. The pioneer work of small omnibus proprietors in opening up traffic routes which the railways had been unable to tap can scarcely be over-estimated, and there is much truth in the contention that the one-man 'bus undertaking

may be the most economic passenger transport agency in sparsely populated areas.

On the roads, as at sea, small concerns grow into large ones by reinvesting past profits. Generally speaking, it has been only in the very largest concerns in Great Britain that the public could invest ; the majority financed their own development until they had reached a size where their position seemed assured, and then the public might be admitted to subscribe for the capital at a figure which remunerated the original owners very handsomely.

There are two ways in which firms can expand : by the simple process of growth, or by amalgamation with other concerns. In either case it is implied that it is profitable to carry on business on a larger scale than was planned under the original investment.

But this question of profitability requires to be analysed. It is generally possible in theory, though not always in practice, to draw a distinction between increased profits from lower costs, the result of operating on a larger scale than previously, and between increased profits from the ability to control the price obtained. The latter is usually due to combination or agreement between firms effecting a monopoly of supply ; but sometimes it is the result of the growth of a single firm to a size at which it dominates the market.

In considering the effects of " rationalisation " it will be clear that there are different optima in size for a firm according to whether it is expected to work under competitive or monopolistic conditions. Thus expansion may be pushed beyond the point at which highest efficiency (i.e. lowest costs) is obtained, in order that control over the market may be achieved. But, taking

the competitive position first, in which the price must be assumed as fixed, it is clear that the fixed capital of an undertaking, its buildings and plant, cannot easily be increased or diminished to match small variations in output. It must accordingly be laid out in the first place with the idea of a hypothetical output, at which the plant works most efficiently, i.e. economically. Divergence from this optimum output will usually spell higher costs and decreased efficiency. Operation below optimum level will mean that the fixed plant is not being fully utilised and its upkeep and renewal has to be spread over a relatively small number of units of output; operation above this level will mean high depreciation, and decreased technical efficiency from overworked plant.

Factors of production can be conventionally graded accordingly to their assumed elasticity of supply. Land is of course in limited supply in "old" countries; and over short periods the supply of buildings and heavy machinery is relatively rigid. Special ability for the work of management is another factor of limited supply whose price is based upon scarcity value and not production cost. The supply of ordinary labour is generally more elastic, but the supply of skilled labour can be both naturally limited and artificially monopolised, as by the "demarcation" rules of trades unions, or the enforcement of an apprenticeship system.

From this it follows that we might expect the tendency for the proportion of direct costs to be highest in those businesses where raw material and unskilled labour comprise the largest proportion of final supply price. In transport, although fuel and lubricants may be regarded as the raw material from which transport

services are produced, they are not usually related to the output of individual units of transport very closely. Labour costs, although generally a very high proportion of total transport costs, show the same characteristics.

It should be noted that in industrial production it is generally less important to distinguish between those plants or firms which are subject to increasing costs (diminishing returns) and those subject to the converse tendency, than between those with fairly constant, and those with widely variable, costs. If costs decline very steeply to an optimum output, they may very well rise steeply once this optimum is exceeded, so that it is less a question of uniformly rising or falling gradients than of the steepness of ascent and descent on either side of a minimum.

The absence of any direct link between raw material and labour costs, and each individual unit of output, gives ground for supposing as a general principle that transport agencies will have fairly marked optima in output. But there are several possible sources of misunderstanding to be cleared away before considering the question of optimum size or output. Capacity and optimum output do not necessarily coincide. A steel-works, for instance, may have a capacity for producing 100,000 tons a year, but its optimum production may be 80,000 tons, at which total selling price covers total expenses by the greatest aggregate margin. The optimum firm, moreover, is not an absolute conception, but as Mr. E. A. G. Robinson has pointed out in another volume of this series, may be a blend or compromise between the optimum technical unit, the optimum financial unit, and the optimum marketing unit.

Another point must be underlined. The "economies of large-scale production" may refer either to the firm, or to the plant. The ability to purchase raw materials in bulk on advantageous terms, to pursue technical research, to follow a co-ordinated sales policy, to specialise the use of managerial ability—these belong to the large firm, whether its plant be physically scattered or united. The ability to specialise labour, to use elaborate machinery and standardised methods, to integrate processes—these belong to the large-scale plant, irrespective of the size of the owning firm.

It is not always easy to determine the relation between "plant" and "firm" in transport. In some sense an entire railway may be considered a single "plant." But its geographical extent raises several problems. For instance, railways are difficult to organise as a unit from the point of view of, say, reducing labour costs. This is one reason why "technological unemployment" has been less severe in railways than in many other industries. Moreover, one part of the "plant" may be under-worked and another over-worked, without it being at all possible to transfer any of the work. Railways have fairly rigid limits to traffic capacity, although radically altered operating methods can effect a certain flexibility; for instance, new signalling methods may revolutionise line capacity. It is obvious that until the optimum traffic is reached, costs per unit will tend to fall. But, having established this tendency to increasing returns in railways, what happens if the optimum traffic is exceeded? If this really represented the physical capacity of the line, costs would immediately become infinite, until the

track could be doubled to accommodate the excess traffic. But there appear grounds for believing that generally the optimum traffic for a given line is below the physical capacity of the line, which is a somewhat indeterminate conception. After the optimum traffic is exceeded, costs rise until, when the physical capacity is being approached, a point is reached at which it becomes cheaper to increase the accommodation by laying down additional rails than to continue to make shift with the overloaded tracks. This point of course may come *after* physical capacity has been reached, in which case the surplus traffic will not be provided with facilities.

It appears probable that some such position existed with regard to the suburban lines in the London area of the former Great Eastern Railway, now merged in the L.N.E.R. A very dense traffic is carried, mainly at low fares, between the City terminus, Liverpool Street, and the suburbs through a "bottleneck" the cost of widening which would run into several million pounds. After the 1914-18 War the capacity of the line had been reached under steam haulage, yet the traffic was still growing. On the other hand, the company considered that at the level of fares, neither electrification nor widening the "bottleneck" could be made to cover the costs incurred. Consequently an intensive reorganisation of operating methods was made, with the object of reducing the turn-round time of steam trains in the terminus, the headway between trains and the time spent in stations, with the result that the capacity of the existing lines was considerably increased and the need for electrification staved off for some years. Physical capacity of lines is thus a

conception which needs constant revision in the light of technical progress.

Transport agencies such as railways, which build and maintain their own tracks, generally have marked traffic optima as regards each section of their "plant"; but, as a partial compensation for their inability to transfer an excess at one point to another which is under-employed, they generally enjoy at least a partial monopoly. This apparently is the reason why the optimum size of firm appears to have no very definite "ceiling"; and beyond saying that the optimum appears in most cases to be "very large," it is not possible to generalise. This covers, of course, operation by one firm of many diverse kinds of "plant," such as railways, steamships, road transport, docks, hotels and air lines.¹ The limits to size appear to be those of co-ordination and management, and in the case of joint-stock concerns administered by salaried officials, it is only the very large concern that can offer sufficiently high salaries to attract first-class ability. In the United States, of course, the holding company solves many of the difficulties of large firms and immense "plant"; in Great Britain complete amalgamation has in the past been the rule, but the railways over a decade spent much money in acquiring the stock of road transport companies and air lines.

In shipping and road transport, where the "plant" is mobile, the keener competition appears to impose a limit to size except in cases where combination is successful in producing a partial monopoly. In the tramp

¹ From the start, of course, British railways built their own locomotives and rolling stock to a large extent; while the L.N.W.R. rolled its own rails, thus integrating processes incidental to the production of transport.

shipping industry the advantages of large size in ships normally have to be sacrificed to mobility and flexibility, although the large tramp steamer of over 5000 tons gross has increased in numbers very greatly. Similarly, the limit to the size of competitive "plant" is paralleled by the limitation in size of the fleet due to the management factor. The special ability which is required in this trade makes it important that the physical plant should never exceed the capacity of the management to keep remuneratively employed; thus the tendency in tramp shipping is for medium-sized ships and medium-sized firms.

Where an element of monopoly enters, under the Liner Conference system, the economies of large-scale operation by large ships and large fleets can be realised. Mobility is of less importance where traffic follows regular routes. Profits need not be snatched by keen and skilful management, and consequently the limits to such ability need not restrict growth so arbitrarily. Passenger service, which depends largely upon regularity to produce a "goodwill" or semi-monopoly, is specially adapted to the Conference system, where the technical and managerial economies from large-scale operation can be realised without fear that the concern will be unable to keep its place in the competitive strife.

§ 5. *Railway Organisation.* A special interest attaches to the growth of the internal organisation of railways, especially British railways as being the pioneers; for it represents the first attempt to solve many of the problems of large-scale business. When railways first began to be constructed there was no fund of experience on which to draw; there had been no previous joint-stock

commercial undertakings of comparable size or complexity. The great chartered companies, such as the East India Company, had only required a loosely-knit scheme of management which was inappropriate to the operation of an immense physical plant. Some of the characteristics of shareholders' meetings in the early days have already been mentioned. But even the Boards of Directors were frequently unprepared for the problems they were called upon to handle ; for some time they do not seem to have realised that they would have to concentrate upon matters of general policy. In 1831 the Directors of the Liverpool and Manchester Railway were solemnly deliberating such matters as the bad loading of an individual wagon, the dismissal of a clerk for drunkenness, a claim for a puncheon of gin that had mysteriously disappeared, a quarrel between two minor officials—in short, endeavouring to conduct the day-by-day management of the line.

Soon the absurdity of this became evident. The Board began to be divided into Committees for handling special subjects, such as the supply of locomotive power, or the upkeep of the track. Further, really responsible salaried officials were appointed. The Secretaryship was the first high post to be filled on most lines, and generally included more duties than those of a present railway Secretary. On the Great Western, for instance, the Secretary was for some time in charge of operation as well as of financial matters, and thus really combined the duties of a General Manager with the Secretarial office. Later on two Secretaries were appointed—one financial, the other in charge of operation ; the post of General Manager was not created on this line until 1863.

One of the first difficulties of the early lines was to find suitable officers ; and, since civil life offered few opportunities of obtaining the necessary experience, the Army was drawn upon heavily for men capable of controlling a large staff and executing detailed large-scale plans. Hence the predominance of military titles among early British railway managers—the most famous perhaps being Captain Huish of the London and North Western. It may be perhaps fanciful to attribute to this tradition the excellent discipline of British railwaymen as a class, which dates from the time when the traffic was controlled by “ policemen ” who wore a smart uniform, were under a semi-military discipline and in some cases saluted the trains as they passed. Undoubtedly the enforcement of certain railway by-laws in these early days suggested the court-martial rather than the mere *ὕβρις* of a monopolist.

Although a hierarchy of officials, headed by the General Manager, soon rose into being, there was for a long time no logical distinction between the operating and the commercial sides of railway work. Even the holders of the General Managership on some lines occupied themselves with routine work which now would be performed by subordinates ; as late as the middle of the nineteenth century one General Manager used to spend a regular part of his day on the platform of a terminus seeing that all went well, and regarded his post as largely an outdoor appointment.

The prevailing method of organisation was the “ departmental ” as opposed to the “ divisional ” form of management. Mr. T. Bernard Hare has thus¹ described the fundamental distinction between the two

¹ *British Railway Operation*, p. 136.

systems. "Going back to the beginning of railways, it is not difficult to imagine a railway company sufficiently small to admit of the whole of what may be called the management being within the capacity of one man. As the railway developed in size and in the amount of traffic carried upon it, the time would come when this was no longer possible. At least another member would have to be added. On that stage being reached, the question would immediately arise as to how the total work should be divided. Should the area be divided and each member be in complete, and more or less independent, control of a portion ; or should the division be between the different functions that extend over the whole area ? In the early days there could be only one answer to such a question. A railway was essentially a business to be worked as a whole."

The departmental system meant that there was a continuous chain of responsibility from the local official to the heads of departments. Each officer was only responsible to his departmental superiors, and thus in the event of a dispute co-ordination between departments could only be enforced by headquarters, and ultimately by the one non-departmental official, the General Manager. The grouping of the work within the departments varied on different lines, but a common arrangement was for the Superintendent of the Line to have charge of the passenger commercial work—the control of fares and facilities, etc.—and also of the working of both passenger and goods traffic. The Goods Manager would then be responsible for obtaining freight traffic and fixing rates, etc., for movement of traffic within goods stations, and for collection and delivery services by road ; but not for actual operation of freight

trains on the main line. Other departments, such as those of the Chief Civil Engineer, the Chief Mechanical Engineer, the Chief Accountant or the Solicitor, are described by their titles.

It will be seen that this system did not always provide a logical separation of function. The management of a railway falls into four chief branches: (1) maintenance of way and works, (2) maintenance of rolling stock, (3) securing traffic, (4) moving traffic. The modern tendency is to make a broad distinction between (3) and (4), the Commercial and Operating sides of the business, but to appoint local officials with a joint responsibility to both departments. Otherwise the commercial department may make unreasonable demands upon the operating side in its attempt to secure and retain traffic; while the operating departments will seek to minimise costs without considering the effect on the railway's customers. In at least one case a Traffic Manager has been appointed whose duty is to act as a supreme co-ordinating power between the commercial and the operating sides of the work. But his work must be supplemented by that of divisional officers who can co-ordinate the work lower down the scale, whether they are district superintendents or merely station masters. The British form of "divisional" organisation implies this separation of the two functions together with local co-ordinating officers. Nevertheless, it still retains supreme control over each department by the departmental heads in the central offices.

The American type of divisional organisation is rather different. Owing to the lower average traffic density and the greater geographical areas covered, decentrali-

sation offers special advantages. A single officer is placed in control over all operations within his geographical district—whether relating to permanent way, movement of trains, quotation of rates and fares—subject to general control by headquarters. The result is that inter-departmental friction can be eliminated, local conditions are reflected in the method of business, and decisions can be more quickly reached than if they have to pass back to headquarters.

Since the amalgamation scheme the organisation of British railways has been changing ; one line alone, the Great Western, has retained the departmental system without substantial changes. The London and North Eastern has a headquarters' staff for certain " all-line " work—Accounts, Law, Estate, and so forth—but the commercial and operating work is concentrated under General Managers for different areas, such as the southern, north-eastern, and Scottish. The Southern Railway has separated its Commercial and Operating departments, but provided divisional co-ordination. The London Midland and Scottish has been the pioneer in abolishing the General Managership, and establishing an Executive Committee, consisting of a President (corresponding to the General Manager), and Vice-Presidents in charge of the Commercial, Operating, Finance and Statistics, and Research work. The first President of the Executive, Lord Stamp, combined with this post the Chairmanship of the Company, thus establishing a new precedent for British railways.

CHAPTER IV

COMPETITION IN TRANSPORT

§ 1. *The Mechanics of the Market.* Before considering the forces which ultimately determine the price of transport services, it is proper to glance at the mechanics of price-fixing. Price is commonly defined as being based upon "cost of production," "what the traffic can bear," or some other criterion. But how such principles crystallise into a price-ticket, a table of fares, or a bid at an auction, is not always clear.

There are two chief methods of fixing prices : tariff and contract. In the former case one party (usually the seller) estimates the bargaining strength, or "sales resistance," of the other and embodies the result in a published price schedule. In the second case the bargaining has to be done in respect of each individual transaction and the result is embodied in a contract. A list of omnibus fares, a railway rate-book, a restaurant menu—these are tariffs. An open-air market with no marked prices, a Stock Exchange, a tender for work by a firm, an auction sale—these are contract prices. It is obvious that, where sellers are few, each contributing a large proportion of the supply, buyers many, each representing an insignificant proportion of the demand, the tariff method is the only suitable one. It is widespread in retail trade, and is extending. Its economies

of time, language and patience need no emphasis when a large multiple store is compared with an open-air market. On the other hand, it is unsuited to production under perfect competition, since slight adjustments cannot be made easily and quickly to prevent under-selling. Consequently it is most used where a certain element of monopoly is present—as in selling proprietary and retail articles, or services such as transport. Contract is used for the sale of primary materials such as wheat, or steel bars, that can be sold by sample or description, and which are produced all over the world under competitive conditions. Securities also can obviously be sold by description and a Stock Exchange probably illustrates the most developed form of contract buying and selling.

The tariff form of price in transport is conspicuous in railways, especially in passenger fares, the level of which can only be adjusted with a good deal of trouble, and at fairly infrequent intervals, apart from upheavals such as a currency inflation. The reasons are obvious: the semi-monopoly or “goodwill” of regular service and charges, and the fact that few sellers are dealing with an immense number of small buyers, make it the only practicable method. In Eastern countries, where railway booking clerks have to contend with a public accustomed to bargain before any purchase, a striking illustration of the disadvantages of the contract method may be found. At sea, tariffs are generally maintained by Shipping Conferences, or monopolistic associations, on the principal passenger liner routes. In these circumstances, as when railway companies make agreements to prevent price-cutting, competition between different carriers can only take place in quality of

service. The extent to which buyers can control price—apart from refusing to travel, which would show that the sellers had miscalculated the demand—is limited to patronising reduced fares, where these are offered, in preference to standard fares, despite the lower quality of service.

The tariff is as important for passenger transport in its way as a published time-table—it assures the individual that the service he wants will be available at a given price. Where the same conditions are found in goods transport as in passenger transport—few sellers, many buyers individually of little importance to the market, as when parcels and small consignments have to be transported—the tariff method is adopted. Every railway has its schedule of articles, weights and mileage according to which a small consignment can be accepted and despatched without bargaining. There is a further possible step. The tariff abandons the attempt of the contract system to take into account *all* the circumstances affecting each individual bargain, and assembles transactions in groups according to some convenient distinction. Where the total money sum (and thus the maximum possible deviation from the ideal contract price) is not very large, the transport tariff can be simplified into a “zone tariff,” applicable between all points within a certain radius, or even a “flat rate” irrespective of distance.

When, on the other hand, sellers and buyers are on a more equal footing, contract is almost universal and the “higgling of the market” becomes a reality. Motor lorry owners bid against each other to secure the transport business of industrial concerns. The market for chartering tramp steamers is highly competitive, and

works through brokers or intermediaries in the same way as security or commodity markets. In such cases buyers are often individually larger and more important than sellers.

Railway freight charges are based upon both tariff and contract. Railways are generally larger than their largest customers, although the traffic of a few concerns, such as the United States Steel Corporation, may represent so important a part of the railway's total revenue that they can practically dictate the terms upon which their traffic is to be carried. In most countries there is a standard tariff of charges for freight conveyance which applies automatically to small individual consignments ; but there is also a machinery for negotiating special rates for large consignments with the traders and thus reaching what is really a contract price, or " exceptional rate." In practice such rates in England apply to about three-quarters of all freight traffic

The " exceptional " rate must be recorded after it has been fixed, and under the " law of undue preference " any trader who can show that he is in a substantially similar position to the trader for whom the rate has already been quoted, is entitled to have his traffic carried at the " exceptional " and not the standard rate. Thus it may be said that British railway rates consist of a tariff of standard and exceptional rates, and that the " exceptional " part of the tariff is constantly being augmented by new exceptional rates based upon negotiation and contract in the first place. It may still be considered, however, that the exceptional rate is more of a contract than a tariff price, since a tariff price eliminates bargaining, while a trader claiming

an established exceptional rate is obliged to use some bargaining power in order to show that he is entitled to it.

The question of tariff or contract is of special interest at times when the general level of prices is rising or falling—in other words, when the value of money is changing. It then becomes important to consider whether the price of transport has in general more affinity with wholesale or retail prices. Passenger transport, especially over short distances, resembles retail trading inasmuch as small alterations in costs cannot be easily matched by adjusting prices. Custom and convenience demand that a fare tariff shall be fairly stable, and for small transactions the monetary unit is often not large enough to permit of adjustment—an adjustment of a halfpenny over a very short journey may mean a considerable percentage change in the fare per mile.

Tariff prices such as passenger fares and the standard "class" rates for goods transport may thus be expected to move more slowly than the general level of wholesale prices. On the other hand, tramp steamer freights, motor lorry rates, and to some degree railway exceptional freight rates, being contract prices made in an active market between two classes of business man, may be expected to move more freely. Whether such freedom is always desirable to the user of transport is uncertain. Stability in transport rates is generally considered desirable by traders in the same way that stable foreign exchange rates are so considered, in order that costs can be computed with certainty for the future, and contracts entered into with confidence. On the other hand, falling commodity prices and stable (money) transport charges mean that the proportion by which transport enters into industrial costs tends to rise. The converse

applies to rising prices. The adjustment of transport prices by a monopoly to meet alterations in the price of the article carried is frequently rendered difficult by the fact that if prices are once lowered (as by quoting a new exceptional railway rate) regulations may be invoked which prevent it being raised again if the price of the article carried rises. In the more competitive transport agencies these changes in price are usually effected through the general price-movement altering costs—in the same way that retail prices tend to change after the margin between wholesale and retail has narrowed.

§ 2. *Contract Prices under Competition.* It has been emphasised that the relations between buyer and seller affect the type of price which will emerge from the interplay of supply and demand. The most efficient price is a contract price evolved between two parties of equal bargaining skill ; and thus a produce or commodity exchange such as exists in the chief commercial centres is a highly efficient market. In transport such a market exists in its most developed form for the chartering of tramp tonnage at sea. The dealers or middlemen are forwarding agents or ship-brokers, whose function is to supply exporters with space in which their goods can be carried, and ship owners with employment for their available tonnage. Tramp steamer owners generally sell their services, i.e. ocean freight transport, by means of an agreement known as a charter-party, either direct to the shipper or to a ship-broker in touch with shippers. The charter-party is of two main types—the trip or the time charter, one applicable to a specified voyage to be performed by the ship, another to its hire for a definite

period. The charter-party states the conditions (generally standardised for the different trades) under which the ship is to be employed, the commission or brokerage due and the hire consideration. The trip charter generally is a contract for a specified quantity of transport—so many tons of such-and-such a commodity to be carried at so much a ton between specified points. The time charter on the other hand places the vessel in the possession of the charterer, although operation may or may not rest with the original and permanent owner.

The daily quotations of charter rates are on a highly competitive basis, and the rates are levelled up between different centres by telegraph in the same way that world prices of wheat, or nitrate, or cotton are kept uniform. "Several thousands of ships are scattered all over the oceans of the commercial world, engaged in a traffic that is supplied by hundreds of ports in all climes and all continents, from Greenland to New Zealand. Every day scores, or even hundreds, of these independent vessels are seeking freight to carry. It is a complicated world puzzle to bring together the ships and the freight so that the one may be most profitably employed and the other most economically carried. The work is done by the ship-brokers and steamship agents, who receive their pay in the form of a commission or brokerage, a percentage on the transaction. In all ship-owning countries these firms have their headquarters, and each one has agents and 'correspondents' in many other countries, so that among them all they make a complicated web that reaches to all cities of commercial importance. The web is so bound together by telegraph and cable that, like a spider's web, if touched by

anything of importance at any point the whole structure vibrates with the news."¹

Rates are quoted strictly in accordance with the play of demand upon competitive supply, and may fluctuate rapidly, even in the course of a single day. A species of arbitrage tends to level them up: "thus, for a tramp or sailing vessel chartered to carry bulk cargo to Australia the rate would be much lower if the engagement would enable the vessel to reach its destination about the time when a large quantity of grain would be there forthcoming for shipment."² Similarly, if a shortage of tonnage in the River Plate was tending to raise the price of grain charters from the Argentine, rates to the Argentine would show a falling tendency until sufficient tonnage was moving in that direction to take advantage of the grain freights on the return journey. Grain freights are a particularly highly organised market, for they are quoted on many exchanges alongside the commodity itself; "vessels may be chartered, vessel space engaged and marine insurance obtained on the floors of these buildings."³

The liner companies, although they generally own the vessels they operate, may have an overflow of traffic, and thus come into the tramp market as charterers of tonnage. The vessels they obtain, usually on a time charter, will be put to sail on their regular services. There is thus by no means a watertight distinction between liner and tramp services. The liners carry the passenger traffic, much high-class freight in small parcels, and also part cargoes or berth cargoes of

¹ J. Russell Smith: *Organisation of Ocean Commerce*.

² *Report of Royal Commission on the Shipping Rings*, p. 13.

³ Johnson and Huebner: *Principles of Ocean Transportation*, p. 155.

any suitable commodities when these are on offer ; while the tramps cater for whole cargoes for the most part, carrying primary materials such as timber, grain, coal and ores. But the tramp may invade the liner field by being chartered by a liner company ; or a ship-broker may charter a steamer and advertise her as " on the berth " for a specified voyage, offering to take miscellaneous cargo in small consignments. In this case the former tramp really becomes a one-vessel " line."

On the other hand, when liners have vacant space, they may compete for part cargoes of primary materials, which normally would be carried by chartering tramp space, at very low rates, since the voyage must be performed in any case and a low-rated cargo is preferable to sailing in ballast. The competition between liners and tramps is thus of a more complex nature than simple competition between tramp owners, whilst the liners' costs are more rigid than those of their competitors owing to the necessity of maintaining advertised sailings.

A parallel case exists in road transport. The one-man lorry owner-driver seeks full loads, or a form of " chartering " of his vehicle ; and the rates he will quote to any place are largely based on his estimate of the return load he will obtain. The extra costs of garage accommodation or sleeping quarters and food for the driver away from home correspond to the price of coal in foreign coaling stations which a tramp steamer owner has to take into account. Regular carriers on certain routes, however, are in a different position ; their costs are more stable and the relations with their customers more permanent. At times of pressure, however, they may hire extra vehicles from outside concerns (witness

the Christmas delivery services of the Post Office) ; in slack periods they may detach vehicles from their regular services to compete for special contract work.

§ 3. *Tariffs and Monopolistic Competition.* Tariff prices, it has been suggested, are inherently difficult to reconcile with perfect competition. But it is clear that the price of such transport supplied under, at least, apparently competitive conditions, is expressed as a tariff. The general answer must be that in such cases the market is somewhat imperfect and the supply is actually being made under conditions of imperfect or monopolistic competition.

There are two principal ways in which competition can be incomplete. It may be that variations, important or unimportant, in the nature of the commodity or service supplied suffice to split up the demand into sections which compete to some extent with each other, while within each section there is only a single source of supply. Alternatively, the number of suppliers of what is a truly homogeneous product may be small, so that variations in supply by individual producers are capable of materially influencing price.

An illustration will show that the first type of variation is especially prominent in so far as passenger transport approximates to a "consumer's service." Although the necessities and minor luxuries sold by retail may be in competitive supply, there is a constant struggle to introduce an element of monopoly. When the product is the result of special ingenuity the law indeed recognises this as legitimate and grants a monopoly in the shape of a patent. Where the article is non-patentable, the supplier endeavours by trade-

marks, distinctive packing and above all by advertising, to separate the market for his product from the general market and acquire a "goodwill" or semi-monopoly. If it is not practicable to monopolise the supply of bread, the next best thing is to pretend that "bread" and "A's bread" are two different articles and consequently have different markets and demand prices. A is thus a monopolist of "A's bread" and in the happy position of selling his output at halfpenny a loaf more than common, competitive bakers' bread.

But of course this does not mean that X, Y and Z cannot wrap their bread in silver paper or cellophane and sell it as a special article, better than just "bread," equally well. In these circumstances the demand for A's bread must ignore the attractions of X's, Y's and Z's bread. The competition is between two articles which are capable of satisfying a single need in different ways, or pretending that they can do so. Accordingly we cannot say that a railway and a steamer service between A and B are in perfect competition as suppliers of, say, passenger-miles—only that they offer competitive satisfactions to people with a demand for transport between A and B. The market for the two services will not be a single market, since many people probably fear sea-sickness and would travel by rail even if the fare were ten times the steamer charge; while others would be prepared to pay more than the railway fare for the sake of enjoying the sea air.

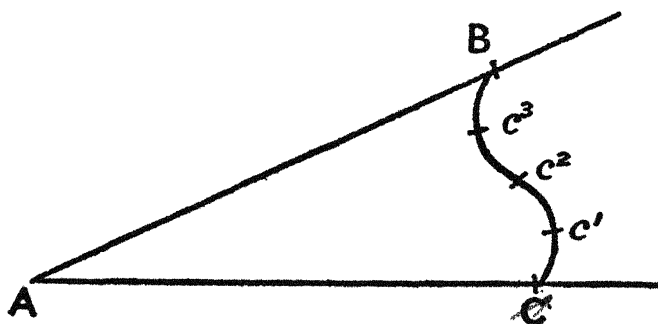
In transport perfect competition is something of a rarity, at any rate on land. It is found in freight road haulage to some extent. It may exist where several motor coach undertakings operate along a common route; but it ceases to exist when one undertaking

alters the quality of its service by providing more modern coaches, or when it is debarred from making intermediate stops permitted to a competitor. Moreover, the organisation of land transport means that the normal type of competition is not perfect, but monopolistic, being effective only at certain "frontier" points while other traffic is monopolised. Unless two railways run parallel with each other throughout, and have stations adjoining, they are not in perfect competition. Part of their traffic is monopolised—firms have private sidings, people reside close to their stations and a long way from those of the competing line—and may be made to bear the costs of competitive rate-cutting in respect of other traffic. The railway wars of Victorian England, of the American lines in the days of Jay Gould and Harriman, were only possible owing to this fact. Otherwise the competitors would merely have ruined themselves. A price war between two great semi-monopolistic competitors usually ends in a price agreement, or the absorption of the weaker concern, and the completed monopoly proceeds to recoup the costs of the struggle from the consumer.

Transport organisations which provide permanently competitive services generally stabilise tariffs upon an agreed basis, and restrict competition to quality of service. An initial period of rate-cutting is thus brought to an end without either destruction of the weaker competitor or creation of a complete monopoly. Unfortunately once prices are stabilised the quality of service sometimes also ceases to be competitive, by arrangement. The British railway companies, when fare-cutting had been abolished, evolved a number of agreements which lasted many years, such as the one

limiting the minimum journey time between London and Birmingham to two hours, and between London and Edinburgh or Glasgow to eight and a quarter hours. A further step away from rate-cutting is a pooling scheme, by which the gross receipts from competitive traffic are pooled, working expenses are deducted and the net receipts are divided in an agreed percentage between the participants.

In the course of time monopolistic competition between transport agencies generally establishes a permanent equilibrium which may or may not be preceded by rate wars, such as were common in the United States or Great Britain during the last century. But these permanent equilibria are frequently unsatisfactory from an economic standpoint, since they fail to secure allocation of traffic to the route technically best qualified to carry it. The use of circuitous routes is an obvious example of economic waste which can hardly be justified on the plea of widening the range of consumers' choice. A familiar type of rate-theory diagram is shown below :



Two railways run from A to B and C which are equidistant from A. But AC has a branch line running to B, and passing through C¹, C² and C³. It is thus, though by a much longer route, also a carrier between A and B. Rates from A to B and A to C are based upon mileage and are consequently identical. But rates for the journey ACB cannot be more than those for AB if competition is to take place.¹ The problem then arises of fixing the rates from A to C¹, C² and C³. These, if fixed strictly according to distance, would reach a maximum at C³. In this case travelling one station further would produce a sharp reduction in rates to the AC level once more. Or rates may rise to a maximum at C² and decline again as B is approached by C³. Or again a flat rate may be charged to C, B and all intermediate stations.

This result arises only under monopolistic competition. Under simple competition it is likely that all traffic would pass direct AB, as the costs of the longer route would be too high for competition. Under pure monopoly no quotation would be made for traffic sent along ACB, as the monopolist's costs would in general be needlessly raised by such an operation. But under monopolistic competition the monopolised part of the traffic can be made to contribute towards the deficiency which such competitive prices entail in the average level of receipts.

This type of competition is keenly felt in Great Britain, with its insular position and indented coastline, between railways and coastwise shipping. Although

¹ Under the Railways Act, 1921, such rates for "circuitous routes" were normally limited to routes not more than 30% longer than the direct route.

the War dealt a blow at coastal traffic, the increase in shallow-draught Diesel-engined vessels in recent years has once more made such competition active. In the United States the competition for coast-to-coast traffic between railways and shipping via the Panama Canal is keen. Between two agencies the equilibrium finally reached is less likely to be wasteful where one agency charges on a cost basis (e.g. coastal shipping) than where both are railways with traffic which can subsidise the competitive rates. Even in the latter case, however, balances will probably be struck which *may* provide an economic division of traffic, although there is no certainty that they will. An official of the London and North-Eastern Railway once quoted an example which illustrates this type of equilibrium. "Wool passes to the West Riding from Hull, Grimsby, Goole, London, Southampton, Liverpool and Manchester. An equilibrium has, in the course of years, been established between the seven competing ports, evolved from the competition of the different railway companies serving the ports, the port authorities, and the shipping companies which bring the wool from Australia."

The objections to monopolistic competition in transport may be summarised as follows: The level of charges is indeterminate, since each competitor will exploit to the full any monopolistic power it may possess over parts of its territory in order to compensate for relatively unremunerative receipts from the competitive part. The use of circuitous routes or relatively inefficient agencies may be perpetuated through this system of bounties and penalties upon different classes of railway user. The arguments in favour are that in practice stability is generally reached, whether there is

preliminary rate-cutting or not, and that competition in quality of service may be preferable to no competition at all.

§ 4. *Cost as an Influence upon Price.* The traditional role of competition is to ensure that in the long run price shall not diverge permanently from the full costs, including normal profits, of a representative producer. This does not mean that each unit of output will necessarily be sold at a price representing its full cost ; the characteristics of the firm and of the industry must be studied before it is possible to generalise further than was done in the previous sentence. There are, for instance, peculiar difficulties in the way of analysing transport's "cost of production." The first difficulty is to find a unit of output or work done. Ton-miles and passenger-miles might at first sight appear to meet the case ; since transport is generally charged for by the unit conveyed (in the case of passengers) or by weight (in the case of goods) multiplied by the distance travelled. But individual ton-miles are almost meaningless as units. If a factory produces silk stockings, or tramcars, or brass bedsteads, there is only a limited possible variation between the different units of output. But a ton-mile can represent carrying a ton of eggs at sixty miles an hour through a tunnel that cost £500,000 a mile to build—or carrying a ton of coals at twelve miles an hour along a branch line laid across level fields. "Tons" differ enormously in bulk, fragility, method of packing and accommodation required ; "miles" have a wide range of possible expensiveness.

Even individual passengers vary considerably in bulk ; but measurement may be regarded as impracti-

cable in a democratic country, and passengers are thus normally charged for by the unit, multiplied by the distance. Normally no attempt is made to reflect in fares the variation in the amount of small services and attention which different passengers may require on a journey ; nor, in Great Britain, is the use of specially expensive passenger stations charged for separately, as in some countries where a small surtax is added where very costly termini are used. It is more usual to average such capital expenditure over the entire traffic, although the maximum fares per mile permitted by Parliament in Great Britain have shown some slight variation due to different capital costs per mile of track.

This variation in " miles " as units of cost is also reflected in goods transport. Rates are affected by variation in the capital cost of track, and, in the case of specially expensive structures such as the Forth Bridge or the Severn Tunnel, may be based on a fictitious number of miles as a contribution to the abnormal costs involved. The Severn Tunnel, for instance, has a legal length for charging purposes of 12 miles, but a physical length of only 4 miles 636 yards. Nevertheless, the most important variation in the unit of work done is in the " tons " rather than the " miles." The cost of carrying a ton of small consignments which require careful packing will clearly be greater than the cost of carrying a ton of coal ; goods whose bulk is considerable in relation to their weight may involve using a truck with a capacity for carrying ten tons for transporting three or four tons, with which it will be fully loaded. The late Sir William Acworth wrote,¹ regarding British railways, that " hay, as cut from the stack and hand-trussed,

¹ *Elements of Railway Economics* p. 122.

loads so badly that an ordinary wagon is generally full with little over 30 cwt. . . . When hay is compressed with a hand machine, 40 cwt. can be loaded in a wagon . . . whilst, when the hay has been hydraulic press-packed, a wagon will hold at least 3 tons." Accordingly, these varying ratios of bulk to weight justify placing hay in three different classes charged at different rates per ton mile, solely on a cost basis.

The eleven lowest classes of the British freight classification are based upon varying minimum weights per consignment, which is purely a cost question. The L.N.E.R. experimentally carried this principle a step further by the introduction of "differential loading rates" between London, Colchester and Ipswich, where the charge is irrespective of the nature of the goods, and based solely upon ability to load two, four or six tons per truck. A railway company, when quoting an exceptional rate in recognition of special "inability to bear" the standard rate, usually stipulates that the traffic shall be delivered in such quantities and such times as will enable a reduction in costs to be made.

Costs are conventionally divided into two classes, according to whether they vary directly with output or not. The class which does vary is known as direct, prime, variable, special or out-of-pocket expenses; the class which does not as on-cost, overhead, fixed, supplementary, or general expenses. The classification must be understood as being relative and not absolute. On a railway, for instance, speaking very roughly, the prime costs are mainly vehicle costs, and the overhead expenses track and office costs. But a good deal of vehicle and haulage costs is independent of the volume of traffic; and much of the upkeep and repair of the

track does depend directly on the volume of traffic. The exact proportions of fixed and variable costs are not ascertainable from an analysis of railway accounts. We cannot settle with actuarial precision how far sleepers rot more than they wear, or rails wear more than they rust. The difficulty of relating upkeep costs to traffic is accentuated by the fact that most railway equipment is exposed to the weather, and by such details as that rails wear faster in tunnels than in the open air, on curved than on straight lines.

The factor which determines the allocation of costs to one class or the other is the element of time. Ultimately an appreciable variation in output will affect all costs; but in the short run it will only affect some. Accordingly costs can be arranged in a series, based upon the order in which changes in output will affect them. At the one end there will be raw material purchases and piece-work wages; at the other, managerial salaries, directors' fees, debenture interest and even normal profits, which may be regarded as an element of long-period cost.

An ordinary industrial concern, producing identical units of product with roughly constant amounts of raw material and labour embodied in each unit, will normally anticipate fairly stable prime costs. A reduction in average costs, as the firm approaches the optimum output, will be mainly effected through the better spread of overhead expenses.

A transport undertaking is in a different position. The prime costs of any particular unit of service will probably be somewhat indeterminate, unless the unit of service coincides with a technical unit such as a wagon load, train load or full cargo. In the case of a railway the

majority of material and labour costs may be and often are not prime costs at all, but incurred in upkeep and repair of the permanent equipment and quite independently of current output. There is another factor. The ordinary industrial producer manufactures in response to orders received ; if he produces faster than consumption, most commodities can be held in stock for a short time until supply is adjusted to demand. But transport is, so to speak, an instantaneous commodity ; it must be provided at the same moment as it is consumed. In many cases, a great part of its value to the consumer depends upon the latter's actual knowledge that it will be available at the very moment it will be required. This means that the costs of running a liner steamship service, or a railway passenger service, are largely independent of the actual volume of traffic. Railway freight services are generally more elastic ; the demand is largely one for conveyance *within* a given time, and not, like the demand for passenger transport, mainly for trains *at* certain convenient times. Thus freight trains can often be cancelled or curtailed if the traffic offering is considered inadequate, just as tramp steamers will tend to avoid a market where freights are scarce, and will seek employment elsewhere. But passenger services demand different tactics, and a great part of railway and steamship costs arises from this difficulty of matching supply to demand in respect of time.

We have seen that average cost is determined by the relation of total output to the optimum. In a similar manner marginal cost is determined by the relation of the individual unit of output to the intermediate technical optima which occur in most forms of transport.

A former President of the Louisville and Nashville Railroad in the United States estimated that the (marginal) costs of carrying a ton of freight one mile under the most and least favourable conditions were in the ratio of about 1 to 500. The level of marginal cost is determined by whether the traffic unit comes immediately under or over an intermediate optimum, such as a wagon load or a train load. If a train is fully loaded with 800 passengers and 801 present themselves, two trains will have to be run, and the marginal cost of the 801st passenger's journey is the total expense of running a complete train. But obviously marginal cost can have little practical significance in such cases; otherwise the 801st passenger might be handsomely bribed by the railway to refrain from travelling. Average prime cost must be the general criterion.

This question of prime and overhead costs has been discussed almost entirely in terms of railways, because it is far more important there than elsewhere. Between 60 and 80 per cent of railway expenses are, in the short run, independent of the volume of traffic. This means that *total* cost per unit of traffic must become a somewhat indeterminate item, since it results from a purely arbitrary division of the fixed expenses among the traffic. Where prime cost accounts for a larger proportion of the total, total cost can be estimated with less artificiality. In concerns such as road transport or shipping, with their higher ratio of prime to total cost, it is possible to base charges upon average prime cost with a percentage allowance for overheads which has been shown by experience to yield satisfactory results.

It must be emphasised that the further the consignment diverges from the unit of conveyance the more

difficult it becomes to establish a relation between the price charged and the special costs involved. A letter, for instance, is so remote from any unit of cost that it may properly be charged for on a flat rate irrespective of distance, though not of weight. The same applies to small railway consignments which require a high degree of distributive services. In many cases the handling and transshipment costs far exceed the actual transit cost; this has provided the justification for the simple scale of railway parcels rates in Great Britain, and the even simpler Post Office scale. Small consignments by goods train may in the future be similarly charged. It is only as the size of consignment grows and approaches a cost unit such as a wagon-load, or better still a train-load, that marginal and average prime cost tend to coincide, and can be both reflected in the price. Even so, prime costs are relatively so unimportant as compared with overhead costs that such a price cannot be said to be based upon total transport costs.

“Blanket rates,” such as exist in the United States, e.g. uniform charges from eastern stations to points west of the Rocky Mountains, are largely based upon the economy which a long haul, with economical usage of rolling stock, provides. This is also reflected in tapering rates, where the *average* charge per mile decreases as the aggregate distance rises. The inelasticity of railway costs might appear a justification for zone rates, such as were developed on the Hungarian State Railways. But there are several drawbacks to the system. If the zones are wide it will be hard to persuade those situated on the wrong side of a zone boundary that they are not subsidising their neigh-

bours' cheap transport. Unless the system is a monopoly it will be very subject to competition in the parts of each zone where its charges are highest per mile, and this may destroy the basis of charging. If the zones are made narrow to avoid these difficulties the great advantage of simplicity in charging vanishes.

In recent years a new form of flat rate has been evolved by the English railways—the “agreed charge.” It is obtained by analysing a given trader’s traffic over a period of years—by average weight of consignment, average distance, average charge per ton, etc., and then evolving from these data a standard rate which will be charged upon *all* that trader’s traffic for the future. Where the traffic consists of identical articles—pigs, or grand pianos, or motor cars—the rate is henceforth a fixed amount per pig, per piano or per car, irrespective of distance. Where the traffic is heterogeneous, it may be so much per ton or per package consigned, irrespective of destination. In the case of Messrs. F. W. Woolworth the rate was fixed annually at a definite proportion of the selling price of the articles consigned irrespective of nature, weight or distance. The agreed charge in any form is a convenience from the book-keeping point of view and assists the trader in future cost estimates. In some respects it resembles the deferred rebate system, in that it is only conceded where a definite agreement is made to ship *all* of a specified type of traffic by the one agency. It does not, however, usually put a definite price upon the trader’s “loyalty” by offering a reduction in transport charges payable over a year; it merely represents a great convenience to both sides from the book-keeping point of view. Where, as in the case of Messrs. F. W. Woolworth’s traffic, it is

calculated *ad valorem*, it may have the added merit of protecting the trader against an increase in the proportionate burden of his transport costs in the event of a fall in the selling price of his commodity.

Despite the growth of road competition and the improvements in the technique of costing in recent years the level of railway charges does not appear to have formed a more intimate connection with railway costs. Charges have undoubtedly moved much closer to the costs of the railways' competitors, especially road transport, whose rates are based on its own costs. Thus (within the limitation of the Parliamentary structure) British railway rates in the higher classes have certainly come to be largely based upon the cost of transporting the goods by road, while in the lower range of the classification the costs of transport by water—canal, river, or coastwise—have always tended to be a limiting factor. It has indeed been suggested that railway rates should be generally based upon road costs, as being simpler and less full of anomalies than either the classification or railway costs; it being believed that on such a basis the aggregate railway receipts would exceed the aggregate expenses by much the same margin as at present. But there has been little attempt to use railway costs; the Inter-State Commerce Commission in the United States, which set out with this object, cannot be said to have achieved it; while the report of the Federal Co-ordinator of Transportation, Mr. J. B. Eastman, recommended a return to the "value of service" principle as a basis for the simplification of railway charges. Recent developments in charging methods, such as the "agreed charge," have not tended towards a cost basis, since the

“agreed charge” preserves all the features of the classification in the gross charge for carrying a specified type of traffic.

§ 5. *Joint Supply and the Price of Transport.* The last section was mainly occupied with the difficulties involved in ascertaining what special costs are attached to any individual unit of transport. It now remains to consider the extreme case of this difficulty in analysing costs—joint supply of transport units in the sense that certain commodities are incapable of production apart from some other commodity. Every textbook instances the familiar fauna that produce wool and mutton, beef and hides in proportions that cannot be arbitrarily altered. The supply price of such commodities will be adjusted, not so that the aggregate of each commodity reaching the market will be sold for a sum covering its cost of production, but only so that the aggregate receipts from the sale of both commodities cover the total costs incurred in producing them.

The difficulty of ascertaining the special or prime costs of units of transport is sufficient to produce occasional confusion between true joint supply and supply of different units of output with a high degree of common supplementary costs. It may be asked what is the importance of drawing a distinction. It is that under ordinary competitive conditions the price of each unit tends to be based upon the special costs involved, with a margin for overhead costs obtained by averaging such costs over the anticipated output. But under conditions of true joint supply, no matter how competitive the market may be, there will not necessarily be a tendency for price to be based upon the costs (either

prime or total) of each unit. The "return load" case in road transport is the simplest possible instance. If it costs a firm $\pounds x$ to send a lorry from A to B or vice versa fully loaded, the costs of the round trip will be $\pounds 2x$. If a rate of $\pounds(x+y)$ can be obtained for the outward journey, the return load will be quoted if necessary right down to $\pounds(x-y)$; and if the rate from B to A will not rise above $\pounds(x-y)$, the rate from A to B will not fall permanently below $\pounds(x+y)$ despite keen competition and the fact that this represents an amount over full costs. The chronic excess in the volume of British imports over exports means that there is usually empty tonnage available in British ports which may have to make, say, a triangular voyage, sailing in ballast to the Continent, to obtain fresh cargo. The costs of such empty journeys must obviously be charged upon the loaded journeys in the long run, no matter how keen the competition.

This illustration shows that there may be a certain importance in ascertaining whether real jointness is present, and not merely a certain difficulty in allocating costs. The latter may ultimately be overcome by improved costing technique under the spur of competition, and thus lead to a closer relationship between price and cost in the case of each unit of output. But where real jointness is present this can never take place.

Two tests may be suggested for true joint supply. On the side of *demand* there must be no interaction between the demand for the two services. An increase in the supply of wool cannot console a hungry man for a shortage of mutton; and similarly, a passenger who wants to travel from London to Manchester and finds

that he has missed the train is not likely to derive any satisfaction from the knowledge that at that moment a train is leaving Manchester for London. On the side of *supply* in Professor Pigou's words, "it is . . . necessary, not merely that additional investment in plant and so on may be used alternately to facilitate the supply to either market, but that such additional investment cannot be used to facilitate the supply to one market without facilitating the supply to the other."¹

These two tests may be applied to various forms of transport which might at first sight be considered to be in joint supply. As suggested above, since transport in one direction involves transport in the reverse direction, and since the markets for these two services may be considered to be effectively insulated from each other, true jointness, with its characteristic effect upon prices, may exist. This jointness only has important effects where the nature and volume of traffic flowing in one direction is materially different from that in the opposite direction. In international trade, although a country's foreign payments and receipts must ultimately balance, there is no inherent tendency for the flow of commodities to be equalised in particular directions. For instance, a classic example of triangular trade used to take place between Great Britain, Brazil, and the United States of America. Great Britain exported finished articles to Brazil, and imported comparatively little from her. Brazil exported most of her coffee to the U.S.A. and had a "favourable trade balance," likewise, with that country. The United States, in turn, exported to Great Britain more than they imported from her.

Mining districts, of course, may be predominantly

¹ *Economics of Welfare* 4th ed., p: 298.

“exporters” inside a country’s frontiers; and the excess of outward traffic may be aggravated by the fact that the wagon in which coal, for instance, has been “exported” may not be suitable for general merchandise on the return journey. Special rates are often quoted for pit-props which can use mineral wagons returning to the pithead. In the United States there was formerly a permanent excess of east-bound over west-bound freight traffic, and a similar excess of west-bound over east-bound passenger traffic until the disappearance of the “frontier” and the decline in immigration.

There is another case in which joint supply is concerned—the question of the time at which units of transport are offered. Passenger transport may be regarded as almost an “instantaneous” commodity in some cases. While the demand for freight transport is normally for conveyance *within* a given time, the passenger demand is (at any rate over short distances) for conveyance *at* certain convenient times. The provision of transport in the same direction at different times undoubtedly falls under the definition of jointness above on the supply side; whether it also does so on the demand side must depend upon whether fare policy can attract traffic from one period to another. The elasticity of transfer of demand in the case of rush-hour traffic, if not absent altogether, is very low. Railway trams and omnibus undertakings offer cheap fares for off-peak hour travel, but generally they do not by this means attract more than a very small amount of traffic away from the critical hours. Their policy in this respect is similar to that pursued by companies that generate electric power, who often make differential

rates for current taken at the peak hours and current taken off the peak. "Rush-hour" services illustrate how the incidence of demand in time can create jointness in supply even where there is no permanent excess of traffic in one direction. Normally, short-distance suburban traffic into and out of a business centre balances itself morning and evening; but since it is impossible to utilise rolling stock economically if it only makes one short journey morning and evening, the provision of rush-hour services in one direction implies the simultaneous running of nearly empty carriages in the other, irrespective of the demand for transport in that direction. Here the phenomenon of jointness is undoubtedly present. On the supply side there is the fact that transport in one direction involves transport in the reverse direction: on the demand side there is a clear division of demand, which in the aggregate is equal for each direction over a whole day, into different directions at different hours of the day.

Broadly, in passenger transport the longer the journey the less important becomes the time-factor in demand. In England, where the distances are so short that most travelling is done in the space of a morning or afternoon, or at most a whole day, lower rates have been offered by railways for journeys of moderate length if performed at night, which is usually not very convenient, in order to obtain a better spread of traffic. The response to these fares indicated that the markets for travel by day and night are not completely insulated from each other. In America, for transcontinental journeys lasting several days, there can be no such discrimination; while if one is sailing round the world, even the day of the week on which the start is made

becomes relatively unimportant. We may thus conclude that for passenger transport the distance between two points is a rough criterion of whether the market for conveyance between these points is likely to comprise a single demand or a number of more or less independent demands at different parts of the day or week. In freight transport, since both schedules and units of conveyance are more elastic, the problem does not arise in such an acute form.

There are various other cases in which joint supply may exist. The design of a ship, as Professor Pigou has observed, practically compels the provision of more and less desirable passenger accommodation. Formerly the forecastle was the least desirable and the poop the most desirable part. But since the advent of the screw steamer the cabins amidships have become more desirable than the stern, since they are away from the noise and vibration of the propeller shaft. There is undoubtedly a joint production here of more and less comfortable travel, which differs from the first, second or third classes on European railways in that the proportions cannot be easily varied. On the other hand the criterion of absolutely separate markets does not hold, except possibly as between first class and steerage. First class is indirectly competitive with second, and second with tourist-third. Moreover, these distinctions tend to disappear with the progress of ship design. Just as the inside and outside places of the old stage coach have not been perpetuated in its successor, the motor coach, so the modern steamship tends towards the one-class type—cabin or tourist-third—in place of the marked variation in accommodation of the older ships.

Certain transport agencies, such as railways and steamships, produce both passenger and freight services ; and since the demands for these types of service are seldom, if ever, interchangeable, there is a possibility that they may be produced under true joint cost. In the case of steamships this is probably true in many cases, for altering the proportions of supply is a difficult business and cannot usually be performed at short notice. And when one service is very much more important than the other—e.g. a tramp steamer licensed to carry a few passengers, or a passenger liner with a little cargo space—the less important service may, if the ship is not bound by Conference rules, be sold at prices bearing little reference to cost—“ dumped,” in other words, as a by-product. This applies especially to passenger liners which may occasionally take berth cargoes of grain or case oil at very low rates on a booked sailing which is independent of cargo—in other words, not qualified by the phrase “ if inducement sufficient,” often added to the announcement of sailing dates.

The question of joint production of goods and passenger transport is important in the case of railways. It is commonly stated that railways are joint producers in such a sense that even under competitive conditions their charges can never be based on cost, since the separate expenses of goods and passenger carriages are not ascertainable. It is a matter of opinion how far these costs are capable of allocation. Clearly they cannot be allocated with precision : no one can accurately divide a signalman's wages, or the wear of rails, or the expense of printing safety regulations, between passengers and goods traffic, and British writers on railway economics generally consider the attempt not worth

making. On the other hand, if a certain amount of arbitrary division is not objected to, it is possible to evolve cost formulæ for dividing overhead expenses in relation to traffic densities ; and in the United States costs have been allocated on elaborate assumed bases, in accordance with the Inter-State Commerce Commission's policy of relating railway rates to cost where possible. Such a policy has a theoretical advantage in that it can indicate generally (though not with real precision) whether one type of service is subsidising another. In the United States it is calculated that on many lines the passenger traffic is carried "on the back" of the freight service. In Britain each class is generally believed to pay for itself.

But, of course, the proportions of supply are by no means fixed. The rolling stock and parts of the stations and marshalling yards are the only equipment which is completely specialised. The adjustments necessary to concentrate upon one type of service only could be rapidly made, and the costs of such a transfer could be greatly reduced when, as is the case on many railways, a large proportion of the capital equipment is old and due for replacement in the near future. The closing down of passenger services on branch lines, due to omnibus competition, has been much stimulated by the obsolescence of station buildings and rolling stock. It may be noted, moreover, that the greatest efficiency in railway working is not derived from a very mixed traffic, but from a homogeneous traffic at a uniform speed requiring few types of vehicles and locomotives. In England the former Taff Vale Railway, with its enormous mineral traffic, and the London Tube lines, probably represented two summits of operating effi-

ciency, though in the latter case the size of the capital investment per mile of line prevented the realisation of high dividend rates.

The question of whether railways are strictly joint producers of goods and passenger transport is thus largely a verbal one. Investment can undoubtedly be applied to either form of service on the basis of existing fixed plant. That is to say, new capital outlay may be concentrated upon passenger engines, carriages and stations, while utilising the existing track, signals, etc. But new railways cannot be built without at any rate a possibility of being used for either passenger or freight traffic.

CHAPTER V

MONOPOLY IN TRANSPORT

§ 1. *Simple and Discriminating Monopoly.* While under competition the individual producer has to take the price at which he can sell his output for granted and adapt his costs to it, under monopoly the producer can by his decisions influence the price. This he normally does in such a way as to produce the greatest aggregate surplus between his receipts and his outgoings which is practicable under the existing conditions of demand. There are two chief weapons in his armoury. He can fix a tariff price at a level calculated to sell the definite quantity which offers him the greatest advantages, taking his costs into account. Or he may place a limited supply on offer and trust that, in so far as his reading of the conditions of demand is correct, this will evoke the most advantageous contract prices.

While under competition profits, the surplus of receipts over full costs, tend to be limited by the expansion of supply wherever they exceed the normal level, under monopoly the control of supply enables the monopolist to retain the surplus when the demand prices for different outputs exceed the full costs of producing these quantities. In short (although there is some artificiality in contrasting a material gain and a purely psychological satisfaction) under competition

the consumer generally enjoys the benefit of the difference between the demand price and full cost when this is favourable to him : under monopoly, however, this consumer's surplus can be reduced in proportion as the sale price approximates to the full demand price.

It will be seen that there is a weakness here. "Consumers' demand" is composed of the separate demand schedules of individuals, each slightly different from another. Thus any single selling price will leave different margins of "consumer's surplus" to each individual, although this margin will never become negative, since a supply price above the demand price will not effect a sale. A complete monopolist, who aimed to transfer all consumers' surplus to himself, would accordingly have to fix a price corresponding with the individual demand price *in each individual transaction*. In other words, simple monopoly, which fixes a single supply price by manipulating supply, is not so lucrative as discriminating monopoly, which fixes different supply prices for the same product, according to the demand price of the individual purchaser.

It is obvious that the opportunities for practising discriminating monopoly are limited. Where the product is transferable and storable the product will be resold by those who have bought at the lower prices and the higher-price market will vanish. Transferability is highest in respect of raw materials ; a "forward market" in commodities consists in buying and selling by individuals who need never see or take delivery of the goods in which they deal. Transferability is low in respect of consumption goods sold direct to the consumer, who generally has neither the capital,

the knowledge nor the inclination himself to become a dealer. Hence it is possible in England to charge school-children a specially low price for milk which they consume in school hours, without fear that the children will embark upon resale to other people. Transferability may be hindered by high storage or transport costs, or even the knowledge that the original seller is powerful enough to eliminate the small dealer in any price war. Oil can thus be sold at varying prices throughout the United States by the large producers without fear of small merchants being able to transport it in bulk from the lower-price to the higher-price markets.

It is clear that a "consumers' service" such as transport is often incapable of transference. The transport of forty tons of pig-iron cannot be substituted for the transport of forty tons of bricks under the noses of the railway officials. It is thus possible to charge differential rates for the transport of bricks and pig-iron. Such a test cannot easily be applied to passenger traffic. Tickets can be and often are transferred from passenger to passenger, despite the existence of regulations to the contrary on many railways. Sharp discrimination would lead to wholesale evasion. In a few cases, however, it is possible to find a rough-and-ready test. Luggage serves to distinguish the bona fide traveller from the excursionist, where the latter is assumed to have a lower, and the former a higher, demand price for what is substantially the same service. In some countries white and coloured passengers are charged different fares for similar transport facilities. Historically, the former three classes on British railways, still found on the Continent, were a rough-and-ready classi-

fication upon the principle of "ability to bear," and although social degrees could not be legally enforced, matters were made very unpleasant for the traveller who failed to take a ticket for the class in which his dress and behaviour seemed to place him. In England, railway directors unleashed their anger against "several most respectably dressed persons riding in the Stanhope compartments, which are intended especially for those who cannot afford to pay for better accommodation." Third class was made deliberately uncomfortable to penalise this type of unscrupulous traveller. One railway bored holes in the carriage side at the height of a passenger's ankles to admit a good draught; another boarded up the windows to exclude the view; and a third was reputed to hire sweeps to make the compartments so sooty as to be unbearable to decently dressed individuals. The underlying idea was to find a test for genuinely low demand schedules, and to prevent the realisation of a consumers' surplus by passengers who in the last resort could be made to pay the first-class fare. It was exemplified in 1842 by the then Chairman of the London and South Western Railway who, in announcing that third-class carriages were henceforth to be attached not merely, as in the past, to the goods trains, but also to the very early morning passenger trains, added that this "will not only give the industrious poor a greater chance of security, but also encouragement for early rising."

§ 2. *Monopoly at Sea.* It has generally proved to be more difficult to maintain a transport monopoly at sea than on land. The mobility of the ship, the small investment required before active competition can commence,

the freedom of the ocean highway and the fluctuation in the streams of traffic have all operated in favour of free competition. There have, however, at times been attempts at combination between owners of chartered vessels or "tramps"; while the competition between liners is regulated or eliminated by Shipping Conferences. Each trade will be considered in turn.

The tramp steamer is the competitive transport agency *par excellence*, and various attempts at restricting competition have broken down in the past. Before the 1914-1918 War the Sailing Ship Owners' International Union attempted to prevent ruinous competition in what was becoming a dying industry. A fall in prices frequently results in a disastrous struggle to secure an increased proportion of a diminishing total between firms who hope thus to cover their overhead expenses; this induces the promotion of schemes which will obviate the more painful consequences of unrestricted competition. At times steamship owners' associations have attempted by mutual agreement to fix minimum charter rates; but neither they nor the large shipping companies that have amalgamated many tramping concerns, have been able permanently to restrict competition. The chartering of vessels is so world-wide a market that temporary shortages of tonnage tend to even out fairly rapidly, either by transfer from other trades or by building new vessels.

Since the depression of the 1930's, however, and the shrinkage of international trade, there appeared a new stimulus to some form of restriction. The apparently permanent excess of tonnage afloat led to competition which forced freights down almost to the prime costs of the most efficient carrier. British shipowners

indeed claimed that such competition was in many cases unfair, owing to foreign vessels enjoying State subsidies of various kinds, being bound by less onerous wage agreements and maintaining a less adequate standard of safety in equipment. Experience of this competition finally led even the most individualist tramp owners to believe that only Government assistance could protect the industry against extinction, and in the autumn of 1934 a State subsidy was granted. Its importance was that it gave the British industry a strong competitive weapon, which however was not used in cut-throat competition with other countries, but became the instrument for negotiating minimum freight rates in the chief trades.

According to the interim report of the Tramp Shipping Administrative Committee the subsidy was essential, since "in consequence of the lateness of the 1935 wheat crop and the accumulation of tonnage in Argentina, the rate of freight for the carriage of grain homewards from the Plate, which largely governs rates in all tramp markets, fell from an average of 16s. 6d. in 1934 to 12s. per ton at the beginning of February, 1935. As 16s. 6d. barely covers the expenses of the average British steamer in the trade without allowing anything for depreciation or interest on capital, there was thus something like a 25 per cent gap between selling price and the cost of production (i.e. between freight and cost of carriage)." The possession of the subsidy weapon enabled a minimum freight scheme on the basis of 16s. 6d. per ton to be negotiated with the Greek and other shipowners in the trade by the British, and this minimum freight clause became effective in subsequent charters.

In the St. Lawrence grain trade, where liners and tramps are in permanent competition, the scheme has stabilised the differential between the liner and tramp rates; according to the report quoted above, "the scheme fixed the minimum charter rate at 1s. 6d. per quarter, as compared with previous contracts for this season at 1s. 3d. per quarter. The corresponding liner rate has been fixed on a scale ranging from 1s. 7½d. to 1s. 10½d. per quarter."

Control of supply is the basis of the monopolist's control over price; and the scheme aimed also at the regulation of tonnage, since a pressure of vessels seeking chartering might lead to a breakdown of the agreements. In the words of the Administrative Committee, the ruling preventing vessels sailing in ballast to the Plate unfixed for their homeward journey "stopped the uneconomic employment of tonnage in ballast seeking cargo, accumulating in Argentina and thereby depressing rates, and ensured that vessels shall only come on the market when there is cargo for them to carry. This, in itself, is an important contribution to the rationalisation of tonnage. It must be recognised, however, that the scope of any system of freight co-operation is necessarily limited so long as the world supply of tonnage remains greatly in excess of the total demand. It has not been thought possible or desirable to apply similar restrictions to tonnage proceeding to the Plate with cargo, as this presents some difficulty. . . . Such tonnage comes on to the River Plate homeward market automatically and to that extent there must always normally be some prompt tonnage available unfixed homewards."

The scheme would be justified only if it tided the

industry over a period of crisis due to exceptional conditions. But if it enabled firms to postpone the laying-up of tonnage dictated by a permanent decline in the volume of world foreign trade, or if it was employed to direct traffic into less efficient rather than more efficient carrier agencies, then it did not differ from many other schemes for raising prices and reducing competition. Much depends on the question of whether British shipping has higher true costs than its competitors, or whether the latter have been employing "unfair" methods such as sweated wages and inadequate margins of safety.

The liner trade, with its more stable organisation, is the true home of monopoly at sea, through the medium of the Liner Conference. These conferences are associations of companies resembling an ordinary cartel or trust, formed to control supply and prices, and to limit entry into the trade. The organisation of a Conference varies; it may simply comprise "informal gatherings or intermittent, irregular meetings, at which rates, sailings or other matters of mutual interest are arranged. There may be nothing but an informal understanding that the traffic officials of one line will consult those of another whenever any rate changes are contemplated, or that a weaker line will follow the rates established by a stronger one. Conferences may, however, be formal organisations with permanent officers, committees, regular or special meetings, rules and penalties."¹

The Liner Conference has two main objects: to regulate competition between its members, and to protect its members as a body against outside competition

¹ Johnson and Huebner: *Principles of Ocean Transportation*, p. 289.

from tramps or non-conference lines. The first object may be attained either by fixing the *actual* rates, or fixing *minimum* rates. The latter method is very common in passenger fares. Pooling is a step further; the profitable emigrant traffic from Europe to North America before 1914 was pooled by the lines which were members of the North Atlantic passenger conferences. The steerage rates were so manipulated that each line received a certain share of the traffic and no more. Differentials may appear in this type of price-fixing to compensate for variations in the quality of service; thus the slower ships have fares below the permitted minimum for mail steamers. In addition to pooling the traffic, the gross or net receipts from the traffic may be paid into the pool, and distributed (after deducting working expenses in the former case) in agreed percentages among the member lines. As conferences are frequently international in character, the foreign lines may be grouped under their flag, and a given percentage allotted to each nation. Lastly, both the tonnage provided by each line in a given trade, and also the number and date of sailings, are controlled by the Conference in most cases.

The second object, the elimination of outside competition, is achieved by the rebate system. It only applies to freight traffic, since passenger traffic is almost exclusively carried on by lines which are Conference members, and in any case the system implies a continuous relationship between the line and its customers. A trader who ships exclusively by Conference boats, at the conclusion of a stated period, usually six months, is credited with a rebate, often 10 per cent of the freights paid by him in that period. But the

rebate is "deferred" in that it is not paid over until a further period of loyalty to the Conference has elapsed. Thus the trader's inducement to remain loyal is increased, since after the first period he is liable to lose a double rebate—which may amount to a considerable sum—for a single defection. The rebates he actually receives are never in respect of the period just ended, but of the one before that.

It is said for the liner companies that if they are to provide regular services whether satisfactory freights offer or not, sailing in ballast if necessary, they must have some assurance that when freights are plentiful the tramps will not be allowed to steal the cream of the traffic away by undercutting the Conference rates. The traders, on the other hand, while appreciating the facilities provided and the value of knowing beforehand that sailings will take place on certain dates, find it irritating when freights are plentiful and there is no Conference boat on the berth, to be obliged to refuse "tramp" offers at low rates on pain of forfeiting two accumulated rebates. The issue is whether the level of rates actually maintained by the Shipping Conferences is sufficient, not merely to cover the cost of sailings when insufficient freights offer, but also to yield a net monopoly revenue to the Conference lines above what a competitive system would produce.

The Shipping Conference is naturally more suited to a trade where consignments are made fairly regularly than where important shipments are made at irregular intervals. A very large shipper, particularly of goods whose value is low in proportion to weight or bulk, has a great inducement to secure the lowest possible freight rates. If regularity of sailing is not of the first impor-

tance, such a shipper will almost always prefer to charter "tramp" tonnage at competitive rates, and will resent the monopolistic practices of the shipping rings. The Government of the state of Victoria in Australia, for instance, brought before the notice of the Imperial Shipping Committee cases in which it was itself as a shipper placed at a disadvantage through the existence of the Conference. On the other hand, small shippers, especially in the export trade, appeared on the whole to find the regularity of shipment a compensation for higher rates.

Conferences were originally formed by the regular lines to protect themselves against "tramp" competition. But until the device of the deferred rebate was brought to bear, there was no positive hold on the shipper's loyalty. Historically, the rebate sprang from the practice of foregoing "primage," which was a legacy from the old days when a ship and her cargo were despatched into the unknown as a "venture," and were in the sole charge of the ship's captain. Primage was a commission, generally 10 per cent of the total freight charge, paid to the captain of the ship by the shippers to enlist his good offices. When later the responsibility of the captain, owing to the growth of international cable communication, became less heavy, the usual explanation of primage, which continued to be paid to the shipowners, was that it represented the hire of the ship's gear, cranes, derricks, etc., in loading and unloading cargo. The liner conferences inaugurated the cancellation of part or the whole of the primage in return for exclusive shipment by their line.

To some extent the deferred rebate is akin to the dividend on purchases at a co-operative store; but

with the difference that the store in this case is able to forfeit the dividend unless purchases are confined to itself, which is not generally practicable in retail trading. The British export trade¹ is the chief repository of shipping conferences. In the import trade organisation has been slower in developing. In 1909, for instance, the Royal Commission of the Shipping Rings described the Calcutta Homeward Trade as follows: "The bulk of the cargo shipped . . . is rough cargo such as linseed, wheat and jute, all of which is suitable for shipment for tramp steamers, but upon cargo of this kind it has not been found possible to impose the rebate system." After 1918, however, the rebate system was introduced in this trade. But in addition to inherent difficulties from the nature of the trade, various governments prohibit the practice. The Union of South Africa, for instance, passed an Act in 1911 withdrawing mail contracts from rebate-giving lines; which compelled the Union Castle Line to abandon the system and substitute another, which is described below. The United States Government prohibits rebates under the 1916 Merchant Shipping Act and the 1920 Jones Act.² The Australian Government acted similarly, as regards the outwards trade from Australia, under the Australian Industries Preservation Act of 1906-10. This Act prevented the Australian Government Commonwealth Line, when it was first formed, from entering a conference; and it was subsequently stated that the Conference lines used the weapon of the rebate system in the trade to Australia

¹ Except in the case of coal.

² A bill has since been introduced into the Senate to legalise rebates.

against the Commonwealth Line, and effectively blocked shipments by the Government-owned boats.

It was natural that the system should give rise to objections, and the Royal Commission which reported in 1909 gave exhaustive consideration to these complaints. The Majority Report of the Commission considered that important advantages accrued to the shippers through the Conference system, and that the rebate or some similar device was essential to the continuance of these advantages. Were the rebates to be abolished they would be replaced by long contracts and preferential freights. It may be noticed in this connection that small shippers frequently derive more relative advantage from the rebate system than large ones, who are in a good bargaining position *vis-à-vis* tramp owners, as large charterers of tonnage. The Report of the Imperial Shipping Committee stated that "the shippers who appeared before us were mostly of opinion that it was extremely satisfactory in their business to know that the freight rate is the same for all shippers. In the case of general merchandise no case was brought to our notice where the general rule of equal freights for large and small shippers was not adhered to. It might happen that the large shipper could secure a reduction in the ruling rate, but where this was done the rate was also reduced for the small shipper irrespective of quantity." The Committee noted another advantage. "In certain cases it was the practice, prior to the introduction of the rebate system, for shipowners when they found it difficult to provide sufficient cargo for their ships, to purchase cargo themselves and ship it more or less as a speculation in competition with the regular merchants. It is implied in the rebate system,

though not explicitly guaranteed, that shipowners shall abstain from any such procedure, and the shippers regard it as important that this position shall be maintained." Such a reversion to the traditional practice of treating a ship and cargo as a single trading "venture" is clearly unsuited to regular trade under modern specialised conditions.

One minor dispute has been left unsettled in connection with the payments of interest on the unpaid rebates in the hands of the shipowners. The shippers regarded these as deposits made by them, or "caution money," on which interest should be paid by the holder; the Conference companies, on the other hand, treated the rebates as voluntary allowances and the unpaid rebates fund as being entirely their property.

The Royal Commission suggested that shippers should combine so as to deal with the Conferences on more equal terms on the analogy of consumers' associations. But since the Commission's report a new method of tying the shippers to the Conference lines has been evolved. It originated in the South African trade after the South African Government had effectively put an end to the rebate system. A form of agreement is drawn up between a representative body of shippers (in this case the South African Trade Association) and the Conference, by which the shippers "agree to give their entire support to the regular lines in the Conference. In return, the lines undertake to maintain regular berth sailings at advertised dates, the ships to sail full or not, and to provide sufficient tonnage for the ordinary requirements of the trade; and further, to maintain stability of freights, which are definitely prescribed in the agreement, and equality of

rates for large and small shippers alike.”¹ It will, however, be seen that the smooth working of the agreement system is largely dependent upon the existence of a representative shippers’ association which can negotiate a stand and form of agreement for all its members. The agreement is not so automatic in its operation as the rebate system, in the absence of a definite tie ; and even if a penalty clause is included it may be difficult to enforce. In certain trades, such as the meat traffic from South America which requires special vessels fitted with expensive refrigerating equipment, the agreement system is in force, and an habitual contract period exists, which may be as long as ten years. An alternative method which ensures the provision of adequate tonnage of a specialised nature is by chartering for five or ten years. But the headway made by the agreement system at the expense of the rebate system has been slow, and the recommendation of the Imperial Shipping Committee, that it should be generally available to shippers as a running option, has not been widely adopted.

Although Shipping Conferences approximate to regional transport monopolies, and in this respect invite comparison with railways, they have not evolved a system of differential rates of universal application, or a standard classification of freight. Each trade has its own dominant types of cargo, and these determine the charging methods. Under the “weight or measurement” system, the standard ton is taken as equivalent to forty cubic feet of cargo space. Should the bulk exceed the standard, it becomes the criterion of charg-

¹ *Final Report of Imperial Shipping Committee on the Deferred Rebate System*, p. 21.

ing in place of weight. But the standard ton varies with the commodity ; thus in the case of rubber it is taken at fifty cubic feet. Classification of goods by the ratio of bulk to weight (or fragility, method of packing, or convenience in handling) is really a cost question, and applies both to tramps and liners. But the liner companies have in addition tariffs for the transport of general cargo in which value plays an important part. Monopoly, or agreement between competing lines, is essential to the maintenance of these discriminating freights, which are based, like railway rates, on the principle of " what the traffic can bear " rather than cost of service. It might be expected from the parallel case of railways and road transport that tramp steamers would compete very strongly for the traffic in respect of which the higher rates are charged. But tramp shipping is primarily organised for the transport of whole cargoes, and only to a minor degree does it compete for parcel or berth freights. Mobility is an essential part of the tramp technique, and although a tramp may quote attractive rates for a small parcel of valuable goods for which Conference rates are high, the shipper has no guarantee that such tramp service will be available in the future, and he is thus unwilling to sacrifice his rebates or break his agreement for the sake of a single advantageous shipment the chance of which may never recur. The liner companies can thus maintain a moderately high degree of discrimination ; although no doubt the possibility of tramp competition, in the case of large shipments of the higher-rated goods, is a limiting factor. The Conference lines will also protect themselves by quoting exceptional rates for large shipments or whole cargoes in competition with tramp

chartering on occasion ; they are, however, bound to some extent by the " law of undue preference," even though this be no more than an unwritten undertaking to preserve equality of treatment between all classes of " loyal " shipper.

It thus appears that discriminating monopoly at sea has not evolved, or been compelled to adopt, a standard classification of freight, but that each trade has worked out its own scale of charges, based partly upon cost and partly *ad valorem*. The possibility of tramp competition, though it has remained in the background, has probably limited the degree of discrimination to some extent. Freight rates at sea thus have a flexibility which is not found in railway rates, despite the fact that the formation of liner conferences has undoubtedly tended to stabilise the level of charges. But no conference can maintain indefinitely a level of rates which is above the world level as a railway can do in some circumstances, since ships are mobile instruments in a way that railways are not. There is a strong tendency for world shipping freights to find their own level.

§ 3. *Railway Freight Rates.* The classic phrase describing differential prices in transport is " charging what the traffic will bear." It is perhaps the slightly sinister sound of this maxim which leads it to be generally ascribed to a French railway manager, although the exact authorship is in doubt.¹ In practice, it means that goods are grouped into classes, according to their ability to " bear " a charge, i.e. their assumed demand price for transport.

¹ M. Aucoq, and M. Solacroup of the Orleans Railway, have each had it ascribed to them.

The British "General Railway Classification of Merchandise" now contains twenty-two classes in which are grouped practically all articles likely to be offered for conveyance. Although the class (and consequently the maximum rate at which transport is charged for per ton per mile) in which an article is placed depends partly upon comparative costs of carriage, liability to breakage, and susceptibility to competitive transport, yet the governing principle is that of market value. Thus, the lowest classes for charging purposes contain the following articles: cinders; limestone in bulk; manure; unground basic slag; and tar. The highest two classes include the following: gold leaf; statuary; aeroplanes, packed; animals, stuffed; cigars; live pigeons; billiard tables; and telescopes. A railway rate-book is thus a striking example of discriminating monopoly, under which transactions are grouped in classes and differential prices charged in respect of what are essentially similar services. It has already been mentioned that the comparative cost of transport of different articles is one factor in deciding in which class an article shall be placed for charging purposes; but in so far as the difference in charge exceeds the difference in cost of carriage, there is discrimination between two articles, and this discrimination is based upon estimated "ability to bear" the extra charge. In passenger fares there may similarly be some element of discrimination between first and third class, to the extent by which the difference in the fares exceeds the difference in the cost of providing the two types of accommodation. The basis is the diminishing marginal utility of money as incomes rise; so that a wealthy traveller can "bear" a charge which more than

measures the difference between the cost of carrying him in comfort and carrying a third-class passenger in less comfort. But such discrimination in passenger fares tends to diminish and is relatively unimportant compared to the freight classification.

Historically, the development of differential rates is easy to follow. It sprang from two sources—the independence of track costs from the volume of traffic, and the natural monopoly possessed by the owners of private tracks. The early British canals, for example, were forbidden to act themselves as carriers until the Act of 1845 empowered them to do so. Consequently their costs, apart from water used in lockage and erosion of the banks, were almost entirely independent of the volume of traffic. The tolls charged were designed to yield the maximum contribution to maintenance charges and interest on capital, while not being high enough to prevent any important traffic from passing. The value of the goods provided a simple test. In its early form the classification was crude enough: here is the 1790 schedule of tolls on the Glamorganshire Canal¹:

Ironstone, iron ore, coal, limestone, lime and all kinds of manure	..	2d. per ton per mile.
Stone, iron, timber, goods, wares, merchandise or other things	5d. per ton per mile.

but it gradually became more detailed, until something very like a present-day railway rate-book was evolved.

The toll, of course, did not represent the full transport charge. The carrier—individual or firm—who worked the canal boats superimposed his own working costs and profit margin upon the Canal Company's tolls.

¹ Quoted by Acworth, *Elements of Railway Economics*, p. 110.

These carriage charges were, however, kept near to cost by competition between carriers ; discrimination rested with the Canal Company's toll.

This splitting of transport charges into a toll and a haulage charge is fundamental in inland transport. Roughly speaking, the haulage charge represents the direct costs of movement : the toll the overhead expenses of the track and organisation. And the theory of railway rates has always been that the rate should cover the movement costs, while the contribution to track costs is determined by " what the traffic can bear."

The dual nature of the price of transport appears of course in the time of the Turnpike Trusts, when the tolls levied were part of the fares charged by the stage-coach proprietors : the trusts charged on differential methods which were necessarily rather more arbitrary than those of the canals. A horseman, a farm wagon, a stage coach, all paid differently ; but " ability to pay " here had no simple measure such as market value to guide it. The irritation and inconvenience caused by such charges were fatal to their survival. On the other hand, the arbitrary levying of a toll upon road vehicles according to weight alone was, as Adam Smith observed, highly unsatisfactory. " A tax upon carriages according to their weight," he writes, " though a very equal tax when applied to the sole purpose of repairing the roads, is a very unequal one when applied to any other purpose, or to supply the common exigencies of the State. When it is applied to the sole purpose above mentioned, each carriage is supposed to pay exactly for the wear and tear which that carriage occasions of the roads. But when it is applied to any other purpose,

each carriage is supposed to pay for more than that wear and tear. . . . But as the turnpike toll raises the price of goods in proportion to their weight and not to their value, it is chiefly paid by the consumers of coarse and bulky, not by those of precious and light, commodities."

"Ability to bear" a rate, as it must be interpreted by railway managers, is by no means a simple deduction from the market price of the commodity. It has been suggested that the principle would be better described as "not charging what the traffic will not bear," since the competitive position of the trader and the possibility of water transport being used are also limiting factors. "Ability to bear" a rate works in two principal ways. In the first place it is used to determine the class of standard rate which is applicable to the article in question. In this case the selling price is the chief consideration, and often a distinction must be made between a higher and an inferior quality of the same article. Thus cured bacon is in a lower class than fresh hams. Moreover, the question of cost of carriage and the question of value occasionally conflict. The cheaper article may be more costly to carry. Railways carry china in three principal packings: in casks or crates, in hampers, or in boxes. "Evidently china in a box will pack better into the truck than china in hampers. Evidently also it is less liable to injury. But experience showed that the custom was to pack the more valuable kinds in boxes, the cheaper kinds in hampers. So china in boxes is classed highest."¹

Value is thus the main agent in determining the position of a commodity in the General Railway Classi-

¹ Acworth: *Elements of Railway Economics*, p. 121.

fication, and consequently the "standard rate" at which it will be carried per ton per mile. But it has already been mentioned that something like three-quarters of British freight traffic has been carried under "exceptional" rates, at varying percentages below the "standard." In this case ability, or rather inability, to "bear" the rate has a different meaning. Broadly, no exceptional rate will be quoted which does not cover the prime cost of moving the traffic; but provided it fulfills this requisite and subject to the sanction of the Rates Tribunal if it is more than 40 per cent below the appropriate "standard" rate, the railway has always quoted an exceptional rate if it was satisfied that the traffic will not pass under the "standard" rate.

The reasons for such special "disability" may be several. A firm may wish to enter a market situated a considerable distance away, and unless it receives favourable transport rates will be unable to compete with other firms closer to the market. In such cases the railway manager will exert special care to ascertain whether the traffic will really represent new business, and will not merely represent a deduction from the business of other firms. Railways will not quote specially favourable rates to a market which they consider is "saturated"; for by doing so they might prejudice old customers for the sake of a new one whose charges per ton per mile may be on a lower basis than those of his competitors. On the other hand, there is a constant desire to maximise the traffic, and thus lighten the incidence of overhead costs upon each individual unit of traffic. Low rates may be freely quoted between points where water competition is acute, since any rate which can show an excess over prime cost will

be preferable to letting the traffic go elsewhere. "Ability to bear" the rate here depends upon the incidence of competition. This form of monopolistic competition frequently leads to "charging more for the short than for the long haul" unless the practice is specifically forbidden by law, as it is in the United States. In the past British farmers have complained that imports of foreign or Dominion foodstuffs were carried by train from the ports to the consuming centres actually past their fields at lower rates than they could obtain for the shorter distance. The railways' answer was partly based upon the comparative costs of transport (since the imported goods were better packed and loaded more economically in bulk than the small consignments of native produce), but chiefly upon the necessity of cutting their rates to meet water competition, since the import rail rates were really part of the through ocean rate and were in competition, e.g. from the Argentine via Southampton to London, with the direct sea route to London all the way from the South American ports. Since the import traffic, even at the specially low rates, could be economically handled and the receipts showed a surplus over prime costs, it was argued that the British farmer was really benefited, since the burden of railway overhead costs was in the long run eased in so far as they bore upon his traffic.

Accordingly, "ability to bear" determines the level of the standard rate on a long-term view of the price of the article transported in relation to its weight or bulk. In a rather different sense it determines the quotation of exceptional rates, on a basis of the circumstances of the individual firm seeking transport, or in relation to the competitive power of other transport agencies.

§ 4. *The Social Aspect of Monopoly.* One of the major changes in public opinion in recent years has been the gradual desertion of the traditional position with regard to monopoly. It is now frequently urged that unrestricted competition involves drastic and painful adjustments in the structure of industry, hardships for business men, investors and workers alike, for which there is no compensation in consumers' benefits. A system of controlled monopolies, often grandly but loosely described as "economic planning," is considered to be better capable of protecting those engaged in the industry, while an increase in the size of undertakings will, by way of another vague conception, "rationalisation," produce lower costs and ultimate benefit to consumers. "To labour, the elimination of competition removes an important influence tending towards the reduction of money wages; while to the investor, lower costs and the privileges of monopoly hold out prospects of a more certain, if not of a more substantial return upon his capital."¹ Mr. Herbert Morrison, when he was Minister of Transport, voiced a popular opinion when he stated that: "Competition must go; it stultifies progress, endangers the standard of life of the workpeople in the industry, and is too expensive."

Such inversion of the traditional view requires careful analysis. The phrase "wasteful competition" appears paradoxical at first sight, since competition is the agency through which the amount of rewards devoted to stimulating the production of utilities is kept down to the minimum, so that there is an economy of means

¹ G. J. Ponsonby: *London's Passenger Transport Problem*, p. 2.

in attaining any given end. Waste occurs when the quantity of rewards devoted to remunerating a producer is more than the minimum which would have induced him to put that output on the market over a long period, in consequence of which rewards are not available for remunerating other producers and the flow of commodities falls below that which would have been produced under competition.

The most striking attribute of monopoly in transport is the power of differential charging, and it may not be illogical to consider the social aspect of monopoly mainly in relation to the effects of discrimination. Of course, simple monopoly also requires study ; but its major problems are comprised within those of discriminating monopoly.

The main questions to be considered may be set out as follows :

- (1) Monopolistic prices, especially differential prices, are intrinsically capable of yielding monopoly profits : but is this in fact always the case ? Three main reasons why they may not yield such profits have been suggested :
 - (a) Insufficiency of demand coupled with rigid costs,
 - (b) The possession of a social conscience which reduces charges below the practicable maximum, and,
 - (c) The existence of efficient State control of profits.
- (2) If monopoly profits are being earned, can we recognise them as such ?

- (3) Whether or not monopoly profits are made, does monopoly in general produce higher or lower costs, superior or inferior service than under competition ?
- (4) Does differential charging (whether or not it produces monopoly profits) have a beneficial effect upon industry ?

The simplest illustration of case 1 (*a*) above, in which differential charging may fail to produce monopolistic profits through insufficiency of demand and rigid costs, is that of an unprofitable railway, which applies the classification to all the goods it carries, but even on this basis can do little more than cover its expenses. The rigidity of costs is obviously the key to the situation ; and there is no need to repeat how inelastic is the unit of investment in railway transport, or how difficult it is to reduce costs to meet inadequate demand. The proposition can also be viewed from the reverse side ; given fairly rigid cost and demand characteristics, it may be argued that unless differential charging is admitted there will be no chance of aggregate receipts exceeding aggregate expenses. Under such conditions, as when there is an unsatisfied demand for a railway in an area which can only offer relatively light traffic, it is clear that unless charging on a basis of " what the traffic will bear " is practicable the demand will remain unsatisfied and the investment will not be made. Differential charging may thus be a condition of new investment ; and since the traffic *will* pass at these rates, clearly the traders consider that the charges represent something (if only a very little) less than the marginal utility of the service to them. Accordingly,

there is a *prima facie* case for making the railway on these conditions, provided that alternative forms of investment which yield greater margins of consumers' surplus are not thereby inhibited. Much early railway investment in England would probably have been checked had not Parliament sanctioned differential rates from the start.

It must be realised that such an argument may not remain valid, if the investment is successful in developing new traffic. When the railway becomes "mature" it may be arguable that the "value of service" principle should be replaced by the "cost of service" principle, on the analogy of Protective duties imposed to encourage the growth of new industries, which are intended to be withdrawn when the industry reaches a size at which it can compete on equal terms with its foreign counterparts. But just as such proposals to withdraw such duties always meet with vehement opposition from the captains of the industry concerned, so an attack upon the "value of service" principle is met by several arguments, the validity of which will be examined later.

As regards case 1 (b) (the voluntary limitation of charges in the interests of the community), it is very true that a monopoly which expects to expand with the wealth and population of the territory served may have a direct interest in consumers' welfare. A present sacrifice of monopoly revenue may be a form of "casting bread upon the waters" which will encourage the growth of traffic. There may also be, quite simply, a spirit of public service which can conceive of other obligations than those owed to shareholders. This spirit is fostered by the growth in the size of railway

undertakings, for the dwindling of shareholders' control may mean a greater sense of public responsibility. The high officials of railways form a kind of civil service which realises fully its power for good or evil over the national being. It should, however, be remembered that at a time when capital has received less than its usual remuneration it may be very difficult for the management to make concessions to the public which may inflict an immediate injury upon shareholders. The triple duty—to capital, to labour and to the public—is hard to perform at all times ; it is hardest to strike a balance when one or two parties have special claims.

The last case, 1 (c), is concerned with how far monopoly profits are limited by the system of State regulation. The chief principles of State control are described and their varying efficacy discussed in the next chapter. The main point at issue is whether, under the various systems of State control, monopoly profits have in fact been earned ; and this leads us to ask whether we are in practice able to recognise them as such where we believe them to exist.

§ 5. *Over-capitalisation.* When it is sought to ascertain the existence of monopoly profits, attention must first be directed to the size of the capital. If this is excessive, monopoly profits may only represent a small percentage dividend. But the enquiry bristles with difficulties. In the first place, it is peculiarly difficult to estimate the size of capital proper to a given traffic turnover. The nominal amount must be ignored, since it may contain nominal additions through "splitting" shares, bonus issues, and so forth. Nor

can the market value, if there is a Stock Exchange quotation, be used as a guide, since this will merely adjust the capitalised value of the estimated earnings, including net monopoly revenue, to the current rate of interest. Nor is it possible to say that the cost of the physical assets should bear a definite relationship to turnover. Before 1914 an English railway took on an average about eight years to turn over its capital; since 1923, at a higher level of costs and charges but a diminished physical volume of traffic, about four or five years. Had the former operating ratios (proportion of costs to gross receipts) been maintained, the dividends would have been at about twice the pre-1914 rate, and original shareholders would have been compensated for the fall in the value of money which affected the real value of dividends received. Changes in prices after the acquisition of capital assets may distort the entire capitalisation. Replacement value is another test of capital which is unable to contribute much to the question of whether a given concern is over-capitalised; for few concerns would ever reconstruct their capital assets in the same way as they were originally planned.

Under perfect competition there is usually a more or less automatic check upon the excessive growth of capital. A firm's position as a profit making concern depends upon its cost structure, i.e. the ratio of profit to turnover, and also upon the ratio of capital to turnover, which determines the level of dividends produced by the turnover profit. No matter what the profit margin upon turnover, if the capital assets are over-valued the rate of profit is likely to be below that earned by ordinary firms in the industry on their capital, and

consequently the expansion of the concern will be checked by the difficulty of obtaining new capital.

Under monopoly this check does not operate to the same extent.¹ Capital assets may be acquired at inflated money prices in the first instance ; while the nominal capital may be subsequently increased by bonus issues, or by " splitting " shares. Such practices do not affect the aggregate amount payable to the shareholders as dividend ; but as it is spread over a larger nominal capital the rate per cent is lower. It might be thought, since the market price of a share is chiefly the discounted value of future earnings, that bonus issues, or " splitting " shares, would not affect the price. If £1 shares are split into two 10s. shares the market price of the new shares should be half that of the old, since the dividend is likely to be half the old amount. But there are various ways in which " splitting " may give a bounty to existing holders. In the first place, the adoption of a smaller nominal value may increase the market for the shares among small investors. If we imagine a company whose ordinary shares are of £100 par value, and quoted in the market at £400 apiece, it is easy to see that such an investment could only appeal to those of substantial means. If the shares were split into 100 sub-units of £1 each the price might be expected to rise above £4 per sub-unit, owing to the new demand experienced from those with small sums to invest.

Similarly, " splitting " may be calculated to increase the marketability of a holding by segregating the speculative element. A £100 ordinary share on which

¹ New capital, while still requiring to be attracted from other industries, need not be attracted from other firms within the industry

4 per cent or thereabouts is normally paid might be split into a £50 6 per cent Preferred ordinary share, and a £50 Deferred ordinary share. Thus, although the amounts received in dividend were unaffected in the aggregate, the speculative appeal could be concentrated in the Deferred share and the security in the Preferred. The two shares together might have a rather higher market value than the unsplit old share. Sometimes, of course, the splitting was accompanied by actual increases in the nominal amounts. The Taff Vale Railway was empowered by Parliament to expand its stock on the basis of £250 for each £100. The Great Northern Railway converted £100 into £75 4 per cent Preferred and £50 Deferred ; the London and South Western gave its shareholders the option of converting £100 ordinary into £100 4 per cent Preferred and £100 Deferred.

Such watering of capital might make profits look very modest to the superficial observer ; but it was not always undertaken voluntarily by the railways concerned. In some cases it was the result of pressure from large shareholders ; in others, it took place after investment trusts had been formed to buy railway stocks and issue their own " split " stocks against it, distributing the dividends accordingly. It was feared that these trusts would acquire a financial control over the railway if a majority of the ordinary stock were acquired in this way ; and in any case the companies felt that they could distribute the dividend on the split stocks themselves with less expense and trouble if the shareholders desired it.

The question of whether railway capital is really excessive is complicated by the fact that railways

cannot be regarded as ordinary commercial concerns, whose capital should bear some relation to the disposal value of the shareholders' property, i.e. the surplus assets. The only test that can be applied is that of estimated earning capacity. And following the Railways Act of 1921, the "Big Four" British companies were recapitalised on this basis. About a tenth of the aggregate nominal value was accordingly written off. For example, £100 Cambrian Railways ordinary stock, whose dividend prospects were "shadows, not substantial things," exchanged into £2 8s. 6d. of Great Western Railway ordinary stock, not ranking for dividend until 1929.

Labour critics sometimes assert that over-capitalisation depresses wages. Where over-capitalisation exists mainly in the form of ordinary shares the aggregate dividend payable is unchanged despite the smaller nominal percentage. A low rate of dividend per cent is unlikely to affect wage rates where these are fixed by negotiation, since if it is quoted by one side as a debating point the other side is usually astute enough to express the aggregate return of capital as a percentage upon turnover. On the other hand, if a large portion of the nominal capital is expressed as debentures, bank loans or overdrafts, it is *possible* that the effort to cover the interest (and possibly also the sinking fund) requirements will result in high charges and pressure upon wage levels. The Labour attack upon over-capitalisation is less directed at reducing the aggregate surplus of price over cost and procuring benefits for the consumer than at transferring part of the remuneration of capital to itself. Thus Labour has largely abandoned competition, and trusts to controlled

monopoly as the way by which Labour can secure for itself part of the surplus which capital formerly appropriated.¹ This involves the abandonment of any idea that wages tend to find their own level, and, as has well been said, envisages the determination of wages as a battle against capital in which an advance achieved at one point on the front strengthens the whole position instead of involving sacrifices elsewhere.

If, as Labour critics sometimes maintain, the effect of over-capitalisation is to divert excessive rewards to capital, it is clear that only the original shareholders receive the full benefit. The market price will move in accordance with the dividend rate, so that subsequent purchasers of railway stock tend to receive only the current rate of interest as a cash yield, unless the process of "watering" capital is continuous. If the capital is then written down an injustice may be done as between the old and new shareholders.

Now, at a time when prices have risen largely, as was the case during the inflation period from 1914 to 1920, the capital of a business undertaking may be written up to express the higher money value of its assets if this is expected to be permanent. Let us assume that prices have doubled. Then the money value of the assets has doubled, the gross receipts have doubled, the costs and profits are double the former figure, and if the capital retains its former money expression the rate of dividend per cent has doubled. But the real position of shareholders is exactly the same as it was before, since the purchasing power of each £ contained in their dividends has halved. The Railways Act, by limiting net revenue to the 1913 level, prevented the normal

¹ See *Socialisation and Transport*, by Herbert Morrison.

result and, in Lord Stamp's words,¹ "the general body of old railway shareholders has permanently suffered, compared with the general body of citizens. New shareholders, in choosing from rival investments in a competitive field, of course, buy themselves free of the disability (which is thrown finally on to the former owner) and the 'capital levy,' or 'spoliation,' is achieved once for all." In other words, railway capital has been virtually written down in the ratio that post-War price levels stand above pre-War prices, assuming revenue to be stationary.

§ 6. *Profits and Efficiency.* The next point to be considered is the level of efficiency under monopoly as compared with that under competition in transport. Whether or not monopoly profits are earned it is sometimes argued that monopoly produces high costs and charges; for instance, liner companies in certain trades are alleged to have inflated their costs by unnecessarily high depreciation and obsolescence provisions which have enhanced the value of shareholders' property at the expense of the consumer although high dividends have not been distributed.² The questions of efficiency and charges in transport are closely related; although deterioration in the quality of the service may be hard to detect it amounts to a concealed form of price-raising, a charge intended to apply to a certain service being actually applied to an inferior one. There is little doubt that in the days before road competition certain railways with a strongly entrenched monopoly were apt to cut costs in a way which maximised net revenue by

¹ *Railways*, p. 17.

² See Report of the Imperial Shipping Committee.

providing inadequate service to the public. Admittedly, there must always be a tug-of-war, even in the most public-spirited concern, between low costs and high quality of service ; but a poor service did not always mean low charges. Public ownership of a monopolistic concern such as a tramway might offer the public a choice between a bad service but a profit applied to relieve the rates ; or a good service with up-to-date vehicles but a deficit charged upon the rates. Private monopoly in some cases offered neither alternative. It occasionally appeared to regard the public as its natural enemy, as the late Sir William Acworth wrote of a Scottish railway whose management "steadily refused to effect a junction with the line to Perth . . . all passengers for the North had to transfer themselves and their luggage. Not only so, but the train was timed to leave almost immediately after the South mail arrived, and passengers who failed to get across as quickly as the mailbags were sternly shut out and relentlessly left behind. On one occasion a director of the company, finding himself left out with the rest, and refusing to accept his fate with resignation, smashed a window and got in that way."¹

On the other hand, it is frequently argued that a monopoly incurs higher costs through providing a different and superior service to that provided by competition. It may recognise responsibilities which the purely competitive concern, seeking only to carry the "cream" of the traffic, will not shoulder. This is supposed to apply with special force to the Liner Conference system. At its best, this type of monopoly implies a two-fold obligation. The trader is loyal to

¹ *The Railways of Scotland*, p. 118.

the Conference lines ; and these in turn guarantee to put a ship on the berth at the booked dates irrespective of the amount of cargo offering. Such a service may be extremely valuable to the trader in his business ; but it involves the steamship lines in higher all-round costs than if " tramp " tactics were adopted.

The special quality of the service offered makes the liner trade fairly immune from " tramp " competition when the rebate system is used as an additional protection. Nevertheless, if shippers are dissatisfied with the service offered by a conference, they may be prepared to support a competing line which will build its traffic up in the face of the rebate weapon. Finally, of course, it is possible that the new line may force its way into the charmed circles of Conference lines, just as many Continental lines were admitted into British Conferences after the 1914-18 War. In this case the competition becomes a dead letter. But the " dose " of competition may have produced the desired effect upon the quality of service.

A parallel case existed in London urban transport. Soon after 1918 the London General Omnibus Company, a concern which had become largely monopolistic through amalgamations and working agreements, was faced with competition from small 'bus undertakings usually called " pirates." The pirates competed mainly on the busier routes and at the peak periods. They did not attempt to " nurse " the unremunerative routes or to provide such substantial off-peak services as the L.G.O.C. Consequently, their costs were minimised and very favourable operating ratios established. It was stated in evidence before the Joint Select Committee on the London Passenger Transport Bill that the

profits of certain of these undertakings in some years represented dividends from 25·85 per cent to 64·72 per cent on the capital employed in the undertaking.

The weapon of the deferred rebate was, of course, not applicable to this type of competition, and a reduction of fares would benefit both "loyal" and "disloyal" passengers. Moreover, the L.G.O.C. was unwilling to reduce its fares, since it was the strongest support of the "Common Fund" or traffic receipts pool, and a reduction in its contribution might place the "Tubes" in a difficult position. In view of the fact that the pirates were engaged in "skimming the cream off" the traffic the competition was designated "unfair." The grievances of the L.G.O.C. were finally remedied by (1) legal limitation under the London Traffic Act, 1924, of the excess of peak over off-peak services to prevent "creaming" the traffic; (2) gradual absorption by purchase of the competing concerns; (3) formation of the monopolistic London Passenger Transport Board incorporating in itself all the 'bus services within the metropolitan area.

It may be concluded that a monopoly is often in a position to provide the best possible facilities and to direct traffic into the most economical channels to an extent impossible under competition. Nevertheless, temporary competition, even if "unfair," may bring about certain consumers' benefits. A railway may be stung into unwonted enterprise by a growth in road competition. A shipping conference may reduce rates while maintaining the quality of service through a threat that new lines will be formed. On the whole, however, such competition is frequently undesirable as a per-

manency, and the process of elimination often means the payment of compensation to the owners of assets which have become redundant and this may involve higher charges to the consumer over a lengthy period. It seems better, therefore, to rely upon an improved technique of control over monopoly rather than upon the incidence of imperfect competition to produce the maximum benefit for the user of transport. The technique of control has been changing rapidly in the last few years. It is a good many years since an English statesman remarked: "We are all Socialists now"; the public corporation which returns all surplus beyond a fixed rate of interest on its capital to the public or to its customers has become a familiar part of the national life of Great Britain, and, surprisingly, in so individualistic a country as the United States it found perhaps its most highly developed expression in the Tennessee Valley Authority.

§ 7. *Discrimination and the Structure of Industry.* The final issue is whether differential charging has a beneficial effect upon industrial structure. It has already been explained how variation in the ratio of selling price to weight or bulk of articles is taken account of in the General Railway Classification, and in the tariffs of some liner steamship companies. This may be considered socially beneficial if the demand for transport of articles depends directly on their selling price; for charging on a basis of cost would mean even wider fluctuations than exist in the proportion which transport charges bear to selling price. As matters are the range of variation is sufficiently wide, since the goods charged at the lowest actual rates per ton per mile are

usually those in which transport costs absorb the largest fraction of selling price.

Where railways have reached the " mature " stage of development industrial costs generally tend to be based upon differential rail charges. In Great Britain, for instance, especially in the era of Free Trade, low rates on imported raw materials and bulk foodstuffs were a very important factor in the national economy and were compensated by higher rates on manufactured goods brought from the producer to the home market. The free import of foodstuffs and low rates on such traffic were essential in order that industrial costs could be kept at levels which enabled the manufacturing industries to compete in world markets.

The importance of the transport charges on foodstuffs and raw materials in determining manufacturing industry's costs was recognised under the British derating scheme, when railways were relieved of the obligation to pay the greater part of the local taxation assessed upon them, on condition that the relief was passed on by reductions in charges on agricultural products and industrial raw materials. This in part gave effect to the suggestion that certain traffic should be State-subsidised.

Undoubtedly transport charges on what railwaymen call the " heavies " are an important factor in industrial costs, and hence in determining the competitive power of industries. The Balfour Committee on Industry and Trade quoted the following statistics relating to the proportion in which transport charges enter into the selling price of British export goods :

(1) Commodity	(2) Export Value per ton 1924	(3) Cost of carriage by rail per ton	(4) (3) as a percentage of (2)
Coal (shipment) ..	£1 3 6	£0 2 2*	9.22%
Pig Iron ..	6 17 6	0 5 10*	4.24%
Iron & Steel			
Ingots, etc. ..	15 5 0	0 5 7*	1.83%
Machinery ..	96 0 0	0 17 3†	.90%
Cotton Piece-Goods	410 0 0	1 8 2‡	.34%
Boots & Shoes ..	450 0 0	1 15 3‡	.39%

* Based on actual average haul, January, 1925.

† Short haul of about 70 miles, excluding terminal charges.

‡ Arbitrary haul of 100 miles.

In the case of coal for landsale purposes the average length of haul is considerably greater, and the percentage of transport cost in relation to value much higher. But, as the Balfour Report pointed out: "while these figures bring out in a striking manner the fact that the importance of railway rates to manufacturers and traders is very much greater in the case of heavy and cheap products than in that of the finer and more expensive products, they do not by themselves afford an accurate measure of the total cost of railway transport which is incurred in respect of each article." Coal is normally transported once only, from the pit to the consumer; manufactured articles are transported, perhaps many times, as raw materials, semi-finished goods, and finally as the finished product. Another calculation

by the Balfour Committee "showed that while the total charge for carrying a ton of boots by rail from factory to destination was £1 18s. 7d., the railway charges on the materials required for making that ton of boots (hides, leather and tanning materials) amounted to no less than £6 5s., or more than three times as much. The aggregate cost of railway carriage amounted to over 1·6 per cent. of the retail selling value of the goods, of which aggregate the cost of carrying the boots themselves to their market only accounted for one-quarter (or ·4 per cent of the retail selling value)." Similarly in 1925 : "the average railway charges per ton of Cleveland pig iron were 23s. 5d., or roughly 30 per cent of the market price of the pig iron. But of this total only about one-quarter (6s. 3d. or, say, 8 per cent of the price) represented the average cost of carrying the pig iron to the steel works, the remaining 17s. 2d. representing the cost of carriage of the necessary materials (coal, limestone and ironstone) to the furnaces."

The result of the relatively high significance of transport costs in the selling price of raw materials, despite the compensating tendency of the classification, is to make distance from the market relatively more important. Such traffic is highly susceptible to low rates offered by competitive water transport in a country such as Great Britain. If the water route has technical qualifications for such types of traffic which are higher than those of the railway the higher rated rail traffic may be subsidising a form of uneconomic competition between rail and shipping ; although the railways point out that if this traffic (which pays something over prime cost at any rate) did not come on the rail the burden of overhead costs would be heavier on the

remaining traffic. This, of course, assumes that the rates in higher classes do not represent the full marginal utility of the service to individual traders, and that they are capable of being raised to meet rising costs ; also that the railway is earning no monopolistic profits. If a complete transport monopoly is established there will, of course, be no reason why a less efficient (i.e. more costly) route should be used in preference to a more efficient one, since whenever demand has any limits the monopolist is interested in keeping the level of his costs down.

The sensitivity of raw materials to small variations in the price of their transport is not matched in the higher classes. Much of the latter traffic consists of manufactured articles in the determination of whose price level the forces of custom and goodwill introduce an element of friction. A small reduction in transport costs can thus be retained by the producer and not passed on to the consumer ; in any case, it is likely to represent an insignificant fraction of final selling price, e.g. in silks, artificial flowers, or cigars. But, of course, although the consumer may not feel the effect of the classification system through the prices he has to pay for the higher classed articles, this does not mean that producers of these goods will not seek to reduce their transport charges by the use of competitive agencies charging on a basis of their own costs—especially road transport.

The foregoing represents the principal arguments usually advanced in favour of the classification, and for fixing varying margins of price over prime cost dictated by “ what the traffic can bear.” But it is not altogether certain that it is accurate to speak of the lower-rated

traffics as always producing "inadequate" margins over their special costs, or to assume that to carry these traffics in bulk represents a burden which must be relieved by higher rates elsewhere. "Man shall not live by bread alone"; yet certain railways, such as the former Taff Vale Railway, thrive on an almost exclusive diet of coal and heavy minerals. It would seem that low-rated minerals traffic can be highly remunerative provided that it passes in large and regular consignments which allow it to be carried at minimum cost. If it is sent in small consignments which require to be fitted in with other traffic passing at higher speeds, and involve disorganisation of routine, it may well be carried at rates which barely cover the special expenses involved. A good spread of overhead charges over a wide volume of traffic is the first essential of profitable operation; the great Victorian railway strategists who fought and intrigued to secure coal traffic for their lines realised this to the full, even while they maintained in public utterances that this traffic was in reality "subsidised" by the higher rated articles.

There is a second way in which differential charging is held to be beneficial; and that is through the operation of exceptional rates. The classification system is devoted to ensuring that each unit of traffic makes the maximum contribution possible to overhead expenses; the exceptional rate system to seeing that no unit of traffic which can carry even an infinitesimal part of the burden of overheads fails to pass. The broad justification of such rates is that they maximise the volume of traffic, and by doing so widen markets and minimise the imperfection of industrial competition.

Without entering into the refinements of the theory

of imperfect competition it may be said that it implies that each firm producing for the market has an area of supply over which it exercises a more or less complete monopoly. This area is determined by its transport costs, the effectiveness of its advertising, by local prejudice, trade mark and so on. Here we are concerned with the single factor of transport costs in the imperfection of the market for commodities. There are two principal ways in which these costs may be regarded: as an addition to the cost of production of the goods carried or as a deduction from their selling price. In other words, goods may be considered as priced either "f.o.b." at the point of production or "c.i.f." to the place of sale. While this distinction is not of fundamental importance in the case of goods whose value is low in relation to weight or bulk the transport charge is likely to be so substantial for long journeys that the competitive power of their f.o.b. price is limited by distance. If we assume a number of firms producing for a market under simple competition and with similar costs, all quoting identical f.o.b. prices, then if transport charges are based upon cost there would be a series of areas of supply at prices gradually increasing up to "frontier points" equidistant from two factories. This type of "watershed" can in fact exist—e.g. the market for sea-fish in the centre of the United States. Under our assumptions transport would be at a minimum and consumers' choice would also be minimised.

As soon as charging by value and not by cost of service appears, firms are brought into more perfect competition with each other through equal rates being charged for greater and smaller distances so as to maximise traffic. Consumers' choice is enriched; but, on

the other hand, a greater volume of transport has been necessary to bring a given quantity of produce to market.

It has been suggested that the same result might be achieved more equitably were traffic normally carried on a basis of full (not prime) cost, and traffic which it was desirable to have carried below full cost subsidised by the State. Thus the general body of citizens, and not merely a certain class of transport users, would bear the burden. The arguments against such a proposal are practical rather than theoretical and hinge upon the difficulties in the way of charging on a cost basis, and also of determining which industries should receive the subsidy. At present the method of maximising the traffic is roughly automatic in operation.

Finally, in attempting to assess the effect of differential charging, especially in railways, upon welfare, it is important to remember that many of its most characteristic results are not due to pure monopoly but to monopolistic competition. In these circumstances there is always the possibility that competitive traffic is being subsidised through the exploitation of monopoly elsewhere ; and thus, from the national point of view, an undesirable combination of bounties and surtaxes may arise alongside those effects of the classification which appear most beneficial. Provided that discrimination is not in fact the instrument for creating monopoly revenue (and some of the difficulties in the way of ascertaining whether this is the case have been described) many of its effects appear desirable ; on the other hand, its complexity, its unintelligibility to part of the business community, and its uncertain effects in the face of competition are definite drawbacks. The

problem created by competition between road transport based primarily on cost, and railways still obliged to adhere to the classification and differential tariff, is one of the most difficult with which modern economics is faced ; but if the issues have even been correctly described it is a step in the right direction.

CHAPTER VI

THE CONTROL AND CO-ORDINATION OF TRANSPORT

§ 1. "*Planning*" and the Control of Transport. The catchword of our times, "economic planning," is one that can be used in at least two senses. In the first sense it covers interference by the State, e.g. to raise wages where they are "unfair," to control the quality of output under monopoly, or to prevent the transference of costs. This need involve no interference with the basic principle of self-interest and the profit motive. The second sense covers direct and exclusive control over both the means of production and the distribution of purchasing power by the State, as in Soviet Russia. The first instance involves the acceptance of "consumers' effective demand" as the general basis of its plan; the second implies that demand as well as supply is capable of manipulation.

The case for planning in this second sense is founded upon the weaknesses of the price-system. Owing to variation in the marginal utility of money to individuals there is no certainty that a price will equate one man's desire with another man's effort. A price-system is only certain of achieving an ideal economy of

effort and a maximum of satisfaction as between men whose demands¹ are truly matched over the entire range of competitive supply. As matters are the State in almost every country is engaged in "lubricating" the price-machine by the redistribution of wealth. And even where the second or Socialist form of planning is not adopted taxation and differential prices are instruments by which real income is constantly being redistributed.

There is no need to insist upon the difficulties and dangers which arise when the test of effective demand is forsaken. All interference with consumers' choice runs great risks. The estimation of the highest social returns is a matter of immense difficulty; and there is always the temptation, once a course of action has been chosen, to endeavour to make it a success through manipulation of demand. No doubt a State which was a monopolistic manufacturer of soap would hesitate to enact that each of its subjects should take two baths a day; but we know from experience that a State which owns the railway system of its territory is likely drastically to limit the scope of road services which compete with its own undertakings. The artificial stimulation of demand through the withdrawal of substitutes is an ominous possibility.

State-planned production, moreover, need not cover its costs; some Socialists declare that in a Socialist community the covering of costs by individual industries would be regarded as unnecessary. A surplus on one type of production would be applied in cover of a deficit elsewhere, as decided by the planning authority.

¹ And even this leaves the question of "wants," or real needs, as distinct from utilities consciously demanded, unsettled.

Now while covering individual costs has perhaps not the moral significance which is sometimes attributed to it on the analogy of individual solvency, it is a simplification of some value. Once the standard is abandoned the industry acquires the status of a service whose output is indeterminate owing to the absence of a link between price and cost.

It may be noted in parenthesis that it may be possible to link the provision of essential services with the price-system by regarding their cost as a form of compulsory insurance, the premiums for which are collected by the State and assessed on a principle of "ability to bear." Armies, navies, police and street lighting are methods of risk-elimination. But a price-system will not usually produce them. Man, as Adam Smith remarked long ago, is an incorrigible optimist. He despises future risks and, under-insured, trusts blindly in his star. Compulsory insurance by the State, whether the premiums are calculated on a basis of cost or not, may thus increase welfare.

§ 2. *Control and the Basis of Competition.* The simplest form of State control is that which seeks to secure a "fair" basis for competition between different forms of transport. The need for such control depends on the desirability, so long as private resources are being devoted to satisfying private demands under the stimulus and control of a price-system, of equating social and private costs. Of course, a Socialist State in command of all the means of production will pursue the forms which it believes will yield the highest social returns without being troubled by the private returns that would be yielded in a capitalist economy : but we

are not here concerned with such an attempt to escape from the domination of price.

The necessity of equating social and private costs means in the first place that each industry should cover its less obvious private costs such as depreciation and obsolescence, which are part of the social costs involving the maintenance of the national capital. Where it is a question of making a very large investment, such as the construction of a railway or a canal, the State has an obvious interest in seeing that miscalculations are not made, and that the enterprise is not likely to fail to cover its private costs. These large units of investment involve locking up the savings of a great number of people who may be in a position to exact political pressure. Moreover, there is always the possibility that should the enterprise become bankrupt the consumers' interests will demand that the service it provided be maintained at the public expense. In Canada, for instance, it has been found necessary for the State to assume the operation of various bankrupt railways. Such conditions are liable to arise where an enterprise affects the economic life of the entire community, and when the assets have little "break-up" value and cannot be used for other purposes.

In the second place the principle means that the industry should pay for the incidental damage it does to others. The Manchester housewife, for instance, should in theory recover part of her washing bills from the neighbouring factories before the latter pay dividends.

In the course of the controversy which has developed in recent years between road and rail it has been frequently alleged that the road motor transporters do not

cover their full social costs. Before examining this statement it may be pointed out that railways are not entirely free from this fault. They are emitters of smoke and producers of noise and vibration, disutilities which appear in the national accounts but not (normally) in their own. Of course, these disutilities are infinitely less than were anticipated when railways were projected in England ; as learned counsel for the Liverpool and Manchester Railway stated before the House of Commons Committee, " horses have not started, nor the cows ceased to give their milk, nor have ladies miscarried at the sight of these things." Nor (referring to tunnels) did the " deafening peal of thunder, the sudden immersion in gloom, and the clash of reverberated sounds in a confined space combine to produce a momentary shudder or idea of destruction, a thrill of annihilation "—as a medical man had prophesied would be the case. It has, moreover, usually been possible to secure compensation from the railway for tangible nuisances ; or even imaginary ones, as in the case of the English clergyman who secured substantial compensation for his daughters' bedroom windows being temporarily overlooked by navvies constructing a railway.

It is sometimes difficult to impose checks of this kind upon transference of costs by road transport. The Oxford college which discovered cracks in its façade after an unusually heavy lorry had passed down the High Street had no redress. British insurance companies have complained that they were unable to earn a reasonable margin of profit on their motor business ; in which case part of road transport costs were being borne by the investors in insurance companies and other policy-holders, especially those on a " with profits "

basis. The high accident rate was partly the result of low wages and long hours, employment of drivers with insufficient experience or unsuitable temperaments, and use of vehicles in poor condition or overloaded. The noise, fumes and vibration which incommode dwellers on a main road cannot be debited to those who produce them, and there has been depreciation of property for this reason. On the other hand it must be noted that the growth of road motor transport has caused rises in the value of land, just as in the case of railways.

The main issue, however, is whether road transport agencies are enabled to use the roads without covering their track costs in full ; in other words, whether they are being partially subsidised by public funds. Without entering into detailed statistics, in Great Britain the annual expenditure upon roads is approximately covered by taxation of motor vehicles, through licence duties and a petrol tax. But this revenue is not wholly applied to roads ; a substantial part of it (sometimes as much as two-thirds) is applied to general Government purposes. The deficiency is met by the local ratepayer. Moreover, the contribution of road users does not cover interest upon the original capital cost of the road construction.

There are two factors which cannot be measured when the social costs of road transport are considered. One is the free use of capital equipment, or the " legacy of the past " ; the other is the non-commercial use of the roads. There is no particular reason for assuming that were the " legacy of the past " and " community use " commensurable, they would exactly balance out ; but to cancel them against each other is as convenient a way of disposing of them as any. It was on these

grounds that the Salter Conference on Road and Rail Transport in 1932 decided that a fair basis for road-rail competition could be found if road motor users, including private motorists, were taxed to the extent of the total cost of road maintenance.

There were two main objections to this: (a) the receipts from motor taxation were not all applied to road purposes; (b) private cars were subject to sumptuary taxation which did not claim to be related to road use or upkeep. Part of the difficulty was recognised in the Salter Report, when it stated that "it is . . . unreasonable to argue that if contributions and taxation from all sources connected with motoring covers the costs of the road, a fair basis of contribution is necessarily secured. For if a certain class of users, such as those who own private cars, pay more than their proportionate share, it may be just either that the charges upon them should be diminished, or, if Parliament considers them a proper subject of what may be called 'sumptuary taxation,' on the assumption that the possession of a motor car is a presumptive indication of 'ability to pay,' that the surplus should go in aid of the general State revenues. But there is no reason whatever why such a surplus should operate as a relief to the appropriate burden of charges upon the commercial motor users who are in competition with other forms of transport, which must be fairly assessed and imposed if the basis of competition is to be equitable and the resultant division of function economically sound."

But this does not cover the whole case. Unless, on the Salter assumptions that current road costs and no more must be raised by motor taxation, the level of taxes is adjusted to produce this sum and no more, the

basis of division falls to the ground, since one section of motor transport is, by contributions to the Exchequer, actually paying for the " legacy from the past " whether this is officially recognised or not. The Report continues : " We have not felt it our duty to deal with the question of whether, and if so, how much road users such as private motorists should pay beyond their own share of the annual road costs." But the purpose of the Conference was to find a basis for allocation of costs upon which an economic division of traffic might be founded ; and it could not ignore the keen competition between railways, motor coaches and private cars which existed everywhere. To acquiesce in the imposition of special taxation upon one competitor is to abandon the hope of traffic finding its true level.

In its practical proposals, however, the Salter Report worked on the basis of each type of motor transport merely covering its presumed road costs. The scale of taxation it recommended involved raising the licence duties upon commercial vehicles and reducing them upon private cars. Great controversy was evoked in the transport world by the Report, but the Government eventually adopted a modified version of the proposals for commercial licences, while two years later the duties on private cars were reduced.

Without undertaking a detailed statistical survey of road costs, damage by different types of vehicles, and actual mileage per vehicle, the present scale of taxation is probably as near an approximation to full track costs as can reasonably be expected. In other directions the road transport industry has come closer in recent years to covering its full social costs. Insurance rates have been raised to a level which is anticipated to

yield a normal profit ; national agreements covering wages and labour conditions have come into force. There is a system of inspection of vehicles for mechanical condition and fitness to travel. In short, the road motor industry, even though its social costs are still partially indeterminate, has passed from the adolescent to the adult stage.

Different principles arise when control is applied to monopolies. In most countries the State has availed itself of the opportunity of control in the public interest which railways, as monopolistic transport agencies, offer. In return for the right of " eminent domain " the power of compulsorily acquiring property and interfering with established conditions, control over price, quality of service, and profits was gradually extended. The first, and simplest, method of control lies in limitation of the monopolist's profit ; thus the Liverpool and Manchester Railway was originally limited to a maximum dividend of 10 per cent. But this method of control is unsatisfactory ; costs may be unnecessarily high, or capital may be " watered," so that a limitation of dividend need not ensure any benefit for consumers. The next step is the control of prices ; and the private Acts of Incorporation of railway companies contained schedules of maximum charging powers for different classes of goods and of passenger fares. But, as we saw in the last chapter, this does not settle the question of evasion through deterioration of service, which is really a form of concealed price-raising. Finally, control enters upon its most positive and difficult phase, supervising the quality of service : and the British Railways Act of 1921 embodied an attempt at all three forms of control.

§ 3. *The Railways Act, 1921.* Control over railway monopolies, although its technique varied considerably, has had a long history in Great Britain. The Act of 1844, sponsored by Gladstone, embodied two important principles. It exercised a positive control over the quality of service—stipulating for at least one third-class train a day with seats protected from the weather and travelling at an overall speed, including stops, of not less than twelve miles an hour. It also, by creating the special fare of a penny a mile, related the possibility of differential charging (to a limited extent) between classes of passenger to economic “planning” and the redistribution of real income. The statutory provision of workmen’s trains under the Cheap Trains Act of 1883 was an even more important step in the direction of the latter aim, and raised the entire question of compensating the different marginal utility of money to different classes through the charging methods of controlled monopolies.

Nevertheless, there was a period, even longer in the United States than in Great Britain, when competition between railways was regarded as a simpler solution than the extension of positive control. This, however, involved abandonment of the earlier conception that the State should grant the railway a concession upon which certain restrictions were placed in the public interest and which would be an exclusive monopoly for reasons of convenience and economy, just as a public authority will not normally allow its streets to be torn up twice in order that the mains of two competing gas companies may be laid therein.¹ It also involved new responsi-

¹ As a matter of historical interest, however, in the 1840’s some London streets contained the mains of three competing gas companies.

bilities for the State. Railways are such costly concerns, their break-up value is so negligible and the minimum investment in them so considerable, that the greatest care must be exercised to avoid over-building. Redundant or inadequately employed railways may involve heavy wastage. And business optimism may easily lead investors who observe a single railway in profitable operation to conclude that there is room for two. If traffic and costs are both inelastic the total receipts of the two concerns may well be inadequate to cover overhead charges. The State has a clear interest in preventing such malinvestment. Moreover, from the public point of view the cure may be worse than the disease, if an initial period of competitive rate-cutting is followed by agreement and the incidence of an excessive volume of overhead and capital charges on rates and fares. On the other hand, it is important that control should not be exercised, as a result of pressure from sectional interests, to protect the value of existing investments against competition from agencies with high technical qualifications.

The most important single step in the extension of control over railways in Great Britain was the Railways Act of 1921, which definitely marks the end of one epoch and the beginning of another. To visualise the circumstances under which the Act was framed it is necessary to go back to the control period, from 1914 onwards, when the railways were operated for the Government. The State took the receipts, met the working expenses, and paid the shareholders the same net revenue as they had received in 1913 irrespective of whether it was earned or not. After the War it became obvious that enormous arrears of maintenance

required to be made up. A large capital sum was due to the companies under this head by the Government. Nationalisation was in the air, and there was strong pressure on the Government not to restore the railways to private control. But the unprofitable working conditions, due to the sharp rise in costs and the inelasticity of charges, made acquisition unattractive. Instead, it was decided to restore the railways to their owners under a charter which would (a) enable the railways to earn adequate net revenue ; (b) ensure that the public should have a major share in profits above a reasonable sufficiency ; (c) absolve the State from all further liability beyond a capital lump sum for " arrears of maintenance."

The amalgamations under the Railways Act mark the abandonment of the system of limited competition and opposition to combination which had generally characterised British Governmental policy in the past. Many of the amalgamations under the Railways Act had been refused in detail to the companies concerned not so very long before when promoted by private Bill, or had had such onerous provisions added in Committee that the railways had dropped the proposals. Nevertheless, the new groups did not approximate to the French *réseaux*, which had their reserved territory and whose frontiers generally lay along traffic " watersheds." The lines of demarcation followed the main competitive arteries of traffic. The Great Western and the London Midland and Scottish march together between London and Birmingham and Liverpool ; the Great Western and the Southern between London, Exeter and Plymouth ; the L.M.S. and the L.N.E.R. penetrate into the heart of each other's territory, the L.M.S. appearing at Cambridge,

Yarmouth and Edinburgh ; the L.N.E.R. at Stafford, Chester and Fort William. But this was largely a result of tradition, and to parcel the lines up differently would have been an almost superhuman task.

The procedure was for the principal lines (the " constituent companies ") to agree upon a scheme for amalgamation by exchanging their stocks into the stock of the grouped company ; and subsequently the smaller lines (the " subsidiary companies ") were to be absorbed by exchange of stocks or in default by cash purchase. Altogether 121 undertakings were thus merged into the four new companies, twenty-seven constituent and ninety-four subsidiary concerns in all. The effect upon the capital of the main lines has already been mentioned. The method by which charges and net revenue were linked together, and a new machinery set up to supersede the old system of maximum rates, below which the real rate level was determined, is of considerable interest as an experiment in the control of an important industry by the State.

The former schedule of maximum charges were replaced by new " standard rates," which it was intended should be the actual normal charges. It was hoped thereby to reduce the complexity which arises from the presence of masses of exceptional rates representing every degree of divergence from the maximum. But it was not possible to abolish the exceptional rate ; it was merely limited to not more than 40 per cent below the standard rate except where special authorisation was obtained from the Railway Rates Tribunal, the new court which was to replace the Railway and Canal Commission as the arena in which the trader could challenge the railways.

It was attempted to make up for the loss in flexibility of charging by a more exact classification of goods according to their "ability to pay." The old series of classes A, B, C (minerals), and 1—5 (merchandise), were replaced by twenty-two new classes. Rates were also disintegrated into conveyance and terminal charges, so that the old "C. & D." (Collected and Delivered) and "S.S." (Station to Station) classification was abolished. Even the composition of an exceptional rate was to be shown to the trader upon his request. The old freedom in quoting Owner's Risk Rates, a favourite device for attracting traffic which could not bear the full rate, was suppressed, and such rates in future were to bear a real relation to the value of the risk, which was fixed at so much per cent of the rate in each class.

The control of the level of rates and fares was vested in the Railway Rates Tribunal, whose function was to see that adequate net revenue was earned, but that surplus was passed on to the consumer; that the railways' costs were not swollen by inefficient management and the public thereby penalised, and that equality of treatment was maintained in the granting of exceptional or preferential rates.

To implement these principles the railways were each allotted a "standard revenue"—roughly the 1913 net revenue plus additions for capital subsequently raised. If in any year the standard revenue is not received the Tribunal might (if it were satisfied of the efficient management of the railways, and that the lack of net revenue was due to a deficiency of gross revenue rather than excessive costs) authorise charges to be adjusted in a manner calculated to produce the standard revenue in

the future. The Act did not specifically say adjusted *upwards*, although most commentators assume this. On the other hand, where the standard revenue had been exceeded and the tribunal was satisfied that such excess is likely to continue, charges *must* be adjusted downwards to an extent calculated to absorb 80 per cent of the surplus in the next year. Thus the public had a four-fifths and the railways a one-fifth participation in profits above standard revenue.

The implication was clearly that the net revenue was a function of the level of costs and charges. The method of regulation was akin to that applied to link charges and profits in many gas or electricity supply undertakings. For instance, the articles of the Derby Gas Light and Coke Company contain the following provisions : The standard price of gas is fixed at 13s. 6d. per therm, and the standard dividend on the Consolidated Stock at 5 per cent per annum. Dividends *may* rise or *must* fall by $\frac{1}{2}$ per cent per annum for each fall or rise of 0.2d. per therm in the standard price.

When applied to transport this principle ignores the fact that railway traffics are normally fairly closely linked to business activity, which in turn depends largely upon the movement of commodity prices. There is a legitimate assumption that falling prices depress, and rising prices stimulate, business activity. Accordingly, a transport rate which does not vary in money terms from year to year will nevertheless vary if expressed as a proportion of the selling price of the article transported. Thus every change in commodity prices tends, if rates are unchanged, to benefit one or other party. The railway secures a larger proportion of the selling price when prices fall : a smaller when prices

rise. If we assume, as at any rate over short periods will not be far from the truth, that rising prices are linked to rising traffics and vice versa, it is clear that a railway which does not modify its charges in the same direction as commodity prices are moving, is acting in the reverse manner to ordinary commercial concerns. When demand weakens it raises instead of lowering prices; and vice versa.

The special bounties which one group or another gain temporarily from rising or falling prices—business men and traders generally from the former, wage and salary earners and the creditor class generally from the latter—are the product of inelasticity. Wages and interest rates are “sticky” in their response to changes in the value of money (i.e. general price movements) and the time-lag benefits one or the other group. Under the Railways Act transport charges thus become even more rigid an element in the cost structure than wages, or debenture interest: for they should tend to move *against* the general tendency, by rising not only in real, but also in money terms when declining traffic (the concomitant of falling prices) produced a shrinkage of net revenue. In practice, however, no such tendency has appeared.

The standard rates on British railways were brought into force on January 1st, 1928. In the first quarter of 1928 the *Statist* index number of the price of raw materials stood at 86, and of foodstuffs prices at 89. By the first quarter of 1933 these figures were respectively 54.5 and 57. Thus the standard rates for transport of these classes of goods had very considerably increased as a percentage of selling price. Moreover, it is a matter of history that total traffic and (despite

operating economies) net revenue had very considerably decreased. Nevertheless, no attempt was made by the railways to recoup these losses by raising their charges ; no application to raise the standard rates was made to the Railway Rates Tribunal until 1937, when a 5 per cent. increase was granted long after commodity prices had recovered from the low levels of the slump period.

A somewhat similar process took place in passenger fares during this period, when the retail and cost-of-living price indices were falling, though to a less extent than wholesale prices. The increase in the real burden of fares was compensated to some extent by, on the one hand, a greater use of cheap-ticket facilities in place of full-fare services ; and on the other by an extension of such facilities and by an improvement in their quality. This, of course, was really a reduction in prices. Professor Pigou has pointed out¹ that the peak-hour suburban passenger is really charged a higher price than the off-peak passenger, since he pays the same fare for permission to strap-hang in a crowded train as the other does for a comfortable seat. Similarly, if cheap-fare facilities are made practically the equivalent in comfort and convenience of the full-fare service, the effect is really a reduction in the full fare.

As an experiment in linking charges and revenue the Railways Act never properly came into operation. since standard revenue has never been earned. Moreover, the passage of time has demonstrated that a system of controlling charges appropriate to a monopoly may be unfair when applied to a competitor in a keen struggle for traffic. It has also shown that any system

¹ *Economics of Welfare*, p. 295 (4th ed.).

of price regulation which does not allow of some flexibility to compensate for changes in the value of money is likely to involve unfair penalties or bounties between different groups.

Nevertheless, as an experiment in control the Railways Act was in some ways more successful than its American counterpart, the Transportation Act of 1920, on which it was partly modelled. The American Act involved the attempt to eliminate monopolistic profits by controlling rates and fares so as to yield a "fair" return on railway capital as valued for the purpose, i.e. to exclude all "watering." The complexities which this principle involves need not be emphasised; some of them were mentioned in the previous chapter. The growth of road competition and the trade depression have stultified the results of any valuation which did not take these factors into account; and, as in Great Britain, the chief problem has not been the disposal of a surplus, but the covering of costs.

§ 4. *The Meaning of Co-ordination.* Co-ordination, a word almost as widely used and as seldom defined as its great twin brother, "rationalisation," has a meaning somewhat different to "control." The latter covers the relations between a transport agency and the State or one of the State's organs such as the Inter-State Commerce Commission in America. Co-ordination, on the other hand, is a relation between two or more transport agencies. It may apply between similar agencies, as between two railways; or between dissimilar agencies as between a railway and a bus company. Its aims are to provide the consumer with a service at minimum cost through the elimination of technically inefficient

methods ; and to ensure that services which are jointly demanded, or complementary to each other, are supplied in harmony.

There are certain forms of co-ordination which normally appear without the necessity of external intervention. This specially applies between similar agencies. On the Continent of Europe the type of railway coupling, of vestibule connection between passenger coaches, of brake-hose connection, and so on, are regulated by a freely concluded international agreement in order that through workings may be made. There is an office in Berne devoted to permanent international railway co-ordination of this kind. " Communications questions are more likely than others to have an international bearing. Many organisations, official and unofficial, have been formed at one time or another to promote co-operation, such as the Universal Postal Union, the Universal Telegraphic and Radiotelegraphic Unions, the Berne Central Office for Transport by Rail, the International Committee on Maritime Law, International Railway, Inland Navigation, Road and Air Navigation Congresses, etc., not to speak of the innumerable transport agreements between neighbouring States." ¹The League of Nations, while it functioned, was particularly active in fostering this form of international co-operation.

But it would be wrong to assume that, because this type of co-ordination is required by elementary good sense, it can always be trusted to appear. Railway gauges often show a disparity which has no relation to different technical requirements. In certain countries

¹ League of Nations' pamphlet: *International Transit and Communications*.

the economy of the 3 feet 6 inches gauge may be an argument for its adoption in exceptional cases ; but there is no such justification for the variation between the standard European gauge of 4 feet $8\frac{1}{2}$ inches and the Russian gauge of 5 feet. Still more unfortunate is the position of Australia, cursed with three gauges, each of which claims a considerable mileage and a party of supporters when the question of unification is brought up.

British canals are not of uniform gauge. Variations in width and depth and, above all, in the dimensions of locks, prevent through working. On the Continent of Europe, and in parts of the United States, barges of 300 tons or over are the standard unit of conveyance ; but the characteristic English vessel, the narrow " monkey boat," only loads about 30 tons. Such a vessel has a beam of about 7 feet and a length of about 70 feet ; even so, it is not able to pass all canal locks. The " wide boats " of the Leeds and Liverpool Canal, or the Huddersfield Broad Canal, have considerably more beam, but are shorter, and the locks were originally constructed to suit these barges rather than the " monkey boats." Some progress is admittedly being made towards reducing these drawbacks ; the Grand Union Canal, a fusion of three important undertakings, has completed an extensive programme of widening and strengthening its banks, and improving lock accommodation. Nevertheless, British canals still afford an illustration of the worse effects of completely unco-ordinated growth.

On the Continent of Europe, as international trade has expanded, the need for international co-ordination of transport has become especially pressing. The Geneva

Convention on the International Regime of Railways "contains a large number of technical provisions codifying all the facilities necessary for the better utilisation of railways for international traffic, as regards the linking up of railway systems at frontiers, the working arrangements for international traffic, reciprocity in the use of rolling stock and the relations between the railway and its users."¹ It is not necessary to emphasise how far matters have progressed since the early days of British railways, when the Great Western was originally constructed with a gauge of 7 feet, under the impression that, even within one country's frontiers, railways would always be fairly complete territorial monopolies with the dividing line drawn along traffic "watersheds," so that interchange traffic would be of little importance. The State finally settled the dispute between Broad and Narrow gauge by delimiting the area of the former. Unfortunately it cannot always be said that State intervention is an ideal solution. There is a legend, which may be nothing more than a legend, that the British Government appointed an eminent military gentleman to settle the gauge question in Ireland. The arbitrator was expected to choose as the future standard either the gauge which offered the greatest technical advantages, or the one of which the greatest mileage was already open. Instead, the gallant gentleman added up the widths of the gauges in use, divided the sum by the number of examples, and produced the quotient as the ideal gauge, a happy mean to which all new railways were to be constructed.

Certain forms of co-ordination between different agencies, the provision of services which are jointly

¹ *International Transit and Communications*, p. 10.

demand, appear almost everywhere without compulsion. "Who would say, for example, that because the satisfactory completion of a large proportion of long-distance passenger journeys to the Metropolis requires the services of the London taxi-cab trade, that the latter should therefore be in the ownership or control of the main-line railways?"¹ *Laissez-faire* in respect of certain services in joint demand produces satisfactory results. Railway stations are natural focal points for tramway services, just as ports are for railway sidings. Trains are run to connect with steamers, and omnibuses (sometimes!) connect with trains, without a legal obligation to do so.

But it is probably true that no generalisation as to the conditions under which co-ordination is likely to appear spontaneously can be made with safety. On British railways the gauge question required State arbitration²; on the other hand, the Railway Clearing House was formed by spontaneous agreement among the companies to facilitate through rates, standard dimensions of rolling stock, workings on "foreign" lines, and so on. The canals never achieved this degree of co-ordination, and by variation in gauge and a system of "bar tolls" preserved an obstinate individualism. The railways co-operate with ocean shipping; but such co-operation with road services has been slower in growth.

Co-ordination is normally most called for where a form of monopolistic competition exists, as between road and

¹ G. J. Ponsonby: *London's Passenger Transport Problem*, p. 7.

² And yet, as Mr. C. E. R. Sherrington has pointed out, while Parliament was laying down rules to facilitate through working by a uniform gauge, it was often doing its best to prevent the process being carried a step further by amalgamations.

rail. It seeks to abolish the possibly vicious subsidisation of relatively inefficient types of transport, and to allocate traffic to the appropriate channel. Under monopoly it is less likely to be needed if charges are efficiently limited, since in these circumstances the monopolist has a keen interest in keeping traffic to the most economical route ; nor, probably, will co-ordination be necessary under simple competition, which should provide its own safeguards.

Finally, the term co-ordination is often used in a sense which implies no more than the control over supply ; as in a phrase such as " co-ordinating the facilities with the traffic offering." Thus, the restriction on the offering of tramp tonnage in a " saturated " freight market, or the refusal of a licence to a 'bus proprietor who proposes to compete on a route which is considered by the Area Traffic Commissioners in England to be adequately served by present operators—these are forms of co-ordination, at any rate in popular phraseology. This external limitation or redirection of supply in a competitive market implies a weakness in the price-system, which, if the co-ordination is justified, must have shown itself incapable of effecting the necessary adjustment automatically. This type of " co-ordination " is really an example of the economic planning which endeavours to effect adjustments directly that normally would result from the movement of prices but which do not appear owing to faulty functioning of the price-mechanism.

§ 5. *Co-ordination and " Wasteful Competition."* It is generally accepted that one function of co-ordination is to eliminate " wasteful competition "—a term which

requires to be used with caution. Some examples of what may, and what may not, be legitimately considered "waste" can be compared with each other. The case of the competition between the L.G.O.C. and the "pirate" omnibuses in London has already been considered. But there was an even more serious problem in London transport in the 1920's.¹ In North and North-East London surface facilities by road and rail were inadequate to carry the full "peak" load, and serious overcrowding resulted. There was a strong demand for the construction of new underground electric railways, or "tubes," to meet the needs of a growing population. But for many years such construction hung fire. The reasons for this apparent under-investment were that tube railways as a whole were not profit-making concerns. In Lord Ashfield's words, "they have failed to earn anything approaching a reasonable return upon capital invested in them, notwithstanding the fact that some have been able to select the most advantageous routes."

To what should this result be attributed? The "tubes" carried full peak-hour loads and worked with very favourable operating ratios, i.e. percentages of profit on turnover. But their capital costs were very high (according to Mr. Ponsonby, in 1932 the capital cost of constructing new tubes averaged £800,000 per route-mile) and their running expenses were very inelastic. Unless, therefore, they could secure a good load factor throughout the slack hours of the day as well as at the peaks, the profit on turnover was quite insufficient to earn the market rate of interest on their

¹ For a full analysis of the situation see G. J. Ponsonby: *London's Passenger Transport Problem*.

capital. Investment would have been at a complete standstill had not the tubes enjoyed the advantage of a pooling scheme with the omnibuses, the "Common Fund." In any event the construction of new tubes was slowed up, since the directors could not feel justified in materially weakening the position of the Common Fund through unremunerative investment.

The reason for the poor off-peak load was stated to be mainly omnibus competition in the slack hours. And although the tubes and 'buses were under common ownership to a large extent, there was sufficient competition from the "pirates" to prevent the fares being raised above the competition level based on omnibus costs. There was another reason for the paralysis upon tube extension—the possibility of large State-aided schemes of main-line railway electrification in the near future. Such tube extension as did take place was only performed with State assistance in the form of a Treasury guarantee of interest upon the capital cost.

When a complete monopoly was established under the London Passenger Transport Act, tube extension was enabled to proceed, since control was exercised over both the supply and the price of competitive omnibus facilities, and a pooling scheme with the main-line companies was established. The new tubes authorised in 1935 could expect a satisfactory load factor, in so far as control over off-peak omnibus services and fares can ensure this. The question now is whether such restriction is justified. The additional satisfactions gained by the rush-hour traveller through the provision of tube facilities are partially offset by the limitation in omnibuses available to the slack-period passenger. Despite the danger of all such quantitative comparisons

there seems to be some ground for believing that the possible social welfare to be derived from good "peak" facilities is sufficient to justify some departure from the criterion of price and some artificial stimulation of a particular kind of output.

Mr. Ponsonby has suggested that the real solution of the problem might be differential charging between peak and off-peak traffic to an even greater extent than prevails at present. Whether this is practicable must be a matter of opinion; it should be remembered that in addition to the lower off-peak fares such as cheap midday return tickets, the standard fare represents a discrimination between off-peak and peak periods, since it is charged for a very inferior service at the peak hours.

It has been argued that there may be true "waste" which requires elimination when competition prevents the formation of new investment which may yield a large social welfare. On the other hand, where competition is restricted, not in order to evoke new output, but in order to preserve the value of past investment, there is not the same justification. It is sometimes argued, for instance, that where a tramway system which is capable of carrying all the traffic offering is subjected to omnibus competition, and is in consequence unable to earn the current rate of interest on its capital, there is "wasteful" duplication of facilities arising from the new investment in omnibuses, and that the latter should be restricted. This argument, however, does not seem to be valid. What has happened is that the obsolescence—the limit to the period during which consumers' choice is likely to be restricted to tramway travel—was wrongly calculated at the time

the investment in the trams was made. It was then that the "waste," if any, occurred—when the rails were laid down and the cars ordered. Had the board of directors or the municipality in question been possessed of perfect foresight, and envisaged the coming of the omnibus, they would either have adjusted fares so as to amortise the undertaking over the remunerative life of the tramway, or the investment would not have been made. But to ignore the benefit of technical improvements, or deny consumers' freedom of choice in order to protect past investment, is not to prevent but to aggravate waste.

Risk-bearing is the essential function of the investor : if we extinguish both the rewards that attend correct forecasts and the penalties that attend incorrect guesses as to the future trend of consumers' preferences and of technical developments, we lose the main incentive to progress. The great objection to a system of "planned" monopolies in place of competition is, in Professor Pigou's words, that "monopoly makes no proper use—at all events is under temptation to make insufficient use—of that invaluable agent of progress, the scrap-heap."¹ The fundamental aim is that consumers shall secure the benefits of technical progress, and we must be careful that when co-ordination is invoked to this end it is legitimately applied. There is a fundamental distinction between restricting present competition in order to secure new investment whose benefits will outweigh the losses in consumers' choice, and abjuring the benefits of technical progress in order to protect the value of old investments.

The difficulties in analysing the element of waste in

¹ *Economics of Welfare*, 4th ed., p. 342.

the competition for freight traffic which takes place between road and rail are more formidable than in the instances already quoted. In this case there is not only monopolistic competition, but a clash between charging on a basis of value of service and on a basis of cost to be considered. The chief difficulty of the road-rail question is that of settling which class of carriage is handled most efficiently (i.e. at lowest cost) by one type of transport or the other. The divergent views which can be held on this question may be illustrated by the fact that the Swiss Government has accepted the principle that journeys under nineteen miles (30 km.) should be performed by road, over that distance by rail: while the Federal Co-ordinator of Transportation in the United States, Mr. J. B. Eastman, has laid down the principle that rail transport was generally inferior to road transport for journeys under 150 miles and superior for longer journeys. Naturally the different size of the two countries, the variation in average weight per consignment and in the average length of haul contributed to this enormous discrepancy; but the complexity of the problem is well illustrated.

The "unfairness" of road-rail competition is partly the result of the different legal position of the two types of undertaking. In Great Britain, for instance, where railways are "common carriers," they are treated as a single organisation and must accept consignments between any two stations. Moreover, the "law of undue preference" means that between places similar distances apart similar rates must be charged except by way of duly authorised "exceptional" rates. But the 60,000 road hauliers, whether they are "common carriers" or not, do not constitute a single organisation

that can be required to accept comparable obligations. They therefore naturally tend to concentrate upon the more lucrative routes. The structure of railway costs makes the margin of profit very dependent upon the total volume of traffic. Traffic to out-of-the-way places which requires a high degree of distributive services may thus require to be permanently subsidised by that between important centres. The position has been admirably summarised by Mr. Gilbert Walker in a paper,¹ in which it is pointed out that, apart from bulk traffic in the lower ranges of the classification, "the road haulier is carrying the regular traffic in large heavy consignments passing along the main traffic routes; and he is leaving to the railways the comparatively expensive business of carrying the irregular traffics, the small consignments, and the traffic to the relatively out-of-the-way places."

The problem has two aspects: quality and social costs of service. A basis for the division of traffic must take account of this. As a generalisation it may be said, ignoring for the present the question of charging methods, that where the rail (or the road) provides a service intrinsically superior in quality to that of its competitor and comparable in cost, such a service should not be suppressed: and where the two forms provide equivalent services the traffic should be allocated to the route with the lower social costs. It may be hazarded that on main routes, when a good spread of overhead charges can be obtained through a traffic approaching the optimum for the line, railway costs will be lower than those of road hauliers for practically all classes of goods. Moreover, the quality of service,

¹*Economic Journal*, June, 1933.

except in the case of certain special types of perishable goods, will probably be equivalent or higher by rail. On the other hand, for small consignments delivered over a wide area, for short-distance work, and occasional door-to-door delivery of specially urgent goods over longer distances, the road vehicle probably has the advantage both in cheapness and in quality of service. If such a basis for an ideal division of traffic is accepted the task is to find the charging system, monopolistic or competitive, and the methods of co-ordination, which will implement it.

§ 6. *The Achievement of Co-ordination.* Many different solutions of the problem have been sought in different countries. Both the technical and the legal bases of co-ordination vary according to local conditions. In the Anglo-Saxon countries, where railways are generally operated by private enterprise under a perpetual concession, the approach to road-rail co-ordination has been perhaps more hesitant than in the Latin countries where the railways are either owned by the State or privately operated under a concession which at the end of a fixed period, sometimes in the near future, will revert to the State. As a general rule, also, the co-ordination of passenger transport is more easy than freight transport, owing to the greater stability of the industry.

In England the Road Traffic Act of 1930 introduced a licensing system for passenger transport; the licensing authority being the Traffic Commissioners provided for each of thirteen Areas. Road passenger vehicles were divided into express, stage and contract carriages

according to the type of service habitually provided. The level of fares, the excess of peak over off-peak services, the regularity and quality of the service, the existence of alternative railway facilities—all these factors must be taken into consideration in granting a licence. The effect of the Act was to slow down the increase in the number of such vehicles very considerably. The railways exercised freely their right to object to the grant of new licences, and the Act created a semi-monopoly for those firms which were in established business before it became law. The British railway companies, moreover, acquired important shareholdings, directly or through holding companies, in all the larger road passenger transport undertakings. They did not use this power to drive traffic back to the rail through the deterioration of facilities, but left it to the Area Traffic Commissioners to hold the balance even between road and rail. In some cases they even opposed the application of one of their "own" road subsidiaries for a licence, and rested on the Commissioner's decision. It must be remembered that although the returns to the railways from their road investments may be satisfactory as a cash yield, the depreciation in railway capital which competition entails must be charged against these receipts.

The first real step towards co-ordination between road and rail in Great Britain in respect of freight carriage was the Road and Rail Traffic Act of 1933, the motive of which was to provide a basis for an economic division of traffic between road and rail. By it road hauliers were subject to licence and grouped in three classes. The "A" licence applied to carriage for hire or reward, and was only granted subject to pro-

per working conditions, mechanical fitness of vehicles, etc. The licensee could claim the right to a licence in respect of the tonnage which he operated before the Act, but the Area Traffic Commissioners were empowered to use their judgment as regards the granting of licences for further "discretionary" tonnage, after bearing in mind the facilities offered by other agencies and objections which might be raised, as by the railways, against granting such extra licences. The "C" licence applied to ancillary users, and is not subject to such discretion; while the "B" licence was applicable to vehicles used both for ancillary transport and commercial haulage. The Act also legalised the "agreed charge" which the railways had evolved as the method of tariff modification most likely to prove an effective competitive weapon against road competition.

The degree of regulation thus applied to freight road transport was thus rather less than had been already applied to passenger carriage, owing to the more difficult nature of the problem. The "C" licences, moreover, were not co-ordinated or restricted at all. The effect of the Act was to slow up development in the road transport industry as regards commercial haulage, and to increase the value of the "goodwill" of those firms which were engaged in business before the passing of the Act. Under the circumstances a "claimed tonnage" may be a valuable asset with some tincture of monopoly revenue. But the vital question, that of the basis of charging, was left unsettled except for a proviso allowing the railways to quote comprehensive "agreed charges" to traders.

In the United States somewhat similar legislation was passed through Congress, in the shape of the Motor

Carrier Act, 1935. This Act created three classes of common, contract and private carrier, roughly corresponding to the A, B and C licences in Great Britain. The Inter-State Commerce Commission is the licensing body, which possesses control over rates for inter-state transport, but not for transport solely within the boundaries of one state. There is an equivalent to the British "claimed tonnage," but the grant of subsequent licences is to bear less relationship to alternative railway facilities than in England, and the control of motor transport is to be conducted "on its own merits and with regard to its own problems."¹ The Transport Co-ordination Bill in the Argentine, roughly contemporaneous with the American Motor Carrier Act, is similar in most respects, but provides for the co-ordination of tariffs with those of the railway companies by a National Transport Co-ordinating Committee. More rigid restrictions applied in Italy and Germany, where the railways were State-owned and the principle of restricting motor hauls over a fixed distance found considerable favour on the Continent.

Whilst the competition between the public transport agencies, whether engaged in road or rail transport, is a clearly defined problem, in the background of the picture is the further problem of public *versus* private transport. So long as the right of the individual to use his own motor car, and the right of the trader to carry his own goods in his own lorry, remain (in peacetime) unfettered, there is a very marked check upon the charging powers of any co-ordination scheme or joint road-rail monopoly. Rates and fares cannot, in fact, be raised for any journey or commodity much

¹ *Modern Transport*, September 7, 1935.

above the costs of providing equivalent transport by private car or "C" licence vehicle.

It is argued that any scheme for co-ordination of freight traffic may be shipwrecked upon this issue. For just as the haulier, it is said, takes off the "cream" of the railway traffic and leaves the unprofitable residue, so the private trader will carry the higher-rated goods in his own vehicle and save money thereby; but he will nevertheless expect the public transport agencies to be maintained to carry any goods which it is not convenient for him to handle. It can be suggested, in fact, that so long as the trader reserves the right to undercut the public structure by transferring traffic to his own vehicles whenever he can save money by doing so, the load factor of public transport agencies will be reduced, their average costs will rise and hence the rates on the traffic which *must* go by the public transport agencies will be kept up.

The more urgent problem, however, is undoubtedly that of the relationship between the railways and the road hauliers, which depends chiefly upon the clash between two charging systems—one employing an elaborate classification based primarily on "ability to pay," and the other based on direct operating costs plus overheads and profit.

Two suggestions have been made from outside the railway industry for a possible solution. These may be shortly described as the "Smith Plan" and the "Mance Plan."

Mr. Frederick Smith, formerly Chief Transport Executive of Lever Bros. and Unilever, Ltd., urges the universal adoption of the railhead principle which has already been successfully adopted for the rail

traffic of certain large firms. It involves reducing the number of railway collection and delivery points to a minimum, and despatching traffic only in full wagon-loads and at a good average speed between these main traffic centres. The work of distribution, short-distance carriage and the servicing of intermediate stations would be done entirely by road. Railway lines carrying light traffic, and branches acting only as "feeders" to main lines, would be closed, and replaced by road services.

Sir Osborne Mance on the other hand considers that the problem would be solved if the charging system correctly reflected the direct costs of each unit of transport. He proposes pooling the fixed costs of maintaining both the railway and the road systems of the country and meeting these costs by tolls calculated according to "what the traffic can bear" levied on each class of goods at the same figure *whether carried by rail, by a haulier, or in a trader's own "C" licence vehicle*. In addition, the cost of carriage, with a fixed percentage allowance for profit, would then be charged by both railways and road hauliers to the traders. Thus the agency with the lower *direct* costs would always have the lower total rate and would always secure the traffic.

It will be seen that the "Smith Plan" regards the problem of allocating traffic to the agency best qualified to handle it as one to be solved by new operating methods, whilst the "Mance Plan" treats it as one of rate-making.

These two plans represent attempts to sketch an ideal solution. Turning to the actual steps that have been taken by official agencies, under Part III of the

Road and Rail Traffic Act of 1933 a Transport Advisory Council was set up. In 1937 the Council presented to the Minister of Transport a report on "Service and Rates" which recommended the building-up of a system of road rates to provide a basis for stabilising the competition between the two forms of transport. Up to 1938 the railways were believed to consider that this recommendation of the Council would eventually lead to a settlement of the problem. But progress was slow, and in November 1938 the railway companies presented a memorandum to the Minister of Transport which was a complete *volte-face*. They asked for repeal of statutory control of charges including classification, standard rates, publication and the "undue preference" ordinance, in order that they might compete on free and equal terms with the road hauliers.

The Minister remitted this request to the Transport Advisory Council for consideration; and, while the T.A.C. were deliberating, the railways (with the Council's approval) entered into direct discussions with the traders and with other transport agencies. At the same time they launched a publicity campaign to draw attention to their demand for, as they put it, a "Square Deal."

When the negotiations had reached a measure of agreement, the T.A.C. officially blessed the result. The statutory control was to be limited to standard conditions of carriage, the obligation to provide reasonable facilities, and through rates. The classification, standard charges and standard revenue, exceptional rates and the "undue preference" clause were to be abolished. Voluntary conferences were to be established with the representatives of traders and also

with road haulage concerns for making agreed schedules of rates. A Tribunal was to be set up to hear appeals by traders and the Tribunal might itself fix rates in particular cases.

Critics, however, pointed out that a number of points had to be taken into account by the Tribunal in deciding whether a rate was reasonable ; and it was obvious that if a sharp division of opinion were to arise between the railways and the traders, the Tribunal would be swamped with applications to fix rates.

The war intervened in 1939 before the proposed legislative changes could be brought about. Co-ordination or free competition between road and rail remained therefore, an unsolved problem until the introduction of the Transport Bill at the end of 1946.

Broadly speaking, four principal alternatives present themselves :—(a) “ Free ” competition between road and rail, as originally suggested in the railway “ Square Deal ” proposals. (b) Limited competition in quality of service within a framework of fixed rates applicable to both forms of transport. (c) A joint road-and-rail monopoly of public transport (excluding “ C ” licence vehicles) with allocation of traffic by the monopoly organisation to road or rail. (d) A complete transport monopoly, including “ C ” licences, controlled by the State.

A few comments upon each may be made.

(a) The experience of the months following the launching of the “ Square Deal ” campaign seems to show that “ free ” competition between the railways and the hauliers, with the railways able to use their financial strength to undercut any haulier whose competition was considered “ unfair,” could in fact only

lead to *either* the establishment of agreed schedules of rates (which is in effect the second alternative suggested above) *or* to the railways buying out the hauliers piecemeal (which would in effect be the third alternative, i.e. joint road-rail monopoly).

(b) If road and rail were to compete in service but not in price, then the difficulties of building up a common rate structure would be formidable. The T.A.C. Report on "Service and Rates" of 1937 suggested that the road rate schedules should be related only to the cost of characteristics of the road industry. It appears highly optimistic to assume that this would lead to any consistent relationship between road and rail charges. But even if the principle is laid down that the road and rail rates shall be the same for a given transit, the question will arise whether the service provided is really the same. For many commodities road transport is not suitable at all; for others it provides a service which may be preferred by the traders even apart from whether it is cheaper than the railway (e.g. by offering guaranteed delivery not merely *within* a certain time but *at* a certain time of the day).

(c) The third alternative is a financial association of road and rail, in which the railways must obviously be predominant. It has been argued above that co-ordination can be obtained under a complete monopoly, whose charges are limited by public control, since it will obviously be to the monopolist's advantage to despatch each unit of traffic by the most economical route. But this may not apply where a monopolist, who has formerly lost revenue through competition, re-creates his monopoly by the acquisition of fresh assets. He is under a strong temptation to transfer the

additional output to the old assets, rather than write them down to the extent that is called for when the new assets are in full employment. This will not *necessarily* take place, but the railways would be subject to temptation to protect the value of their railway assets by under-employing their road vehicles, if they acquired a monopoly of both forms of transport.

On the other hand, an interesting suggestion has been put forward that the track costs of both road and rail transport should be pooled, leaving competition to be based on direct movement costs. This suggestion received some backing from two of the railway Chairmen in their speeches at railway General Meetings held in the spring of 1945. It might have led to a scheme partly resembling the "Mance Plan," whereby each form of transport would charge rates which reflected the average direct cost for each type of transport, thus securing allocation of traffic to the agency best qualified to handle it. The difficulty of assessing the contribution payable by each agency to the track pool would, however, be the chief stumbling block.

(d) As regards the last alternative, spokesmen of the Labour Party frequently stated that the only final solution to the problem of co-ordination could be found in the creation of a public authority not worked for profit, owning and operating all forms of transport, including railways, canals, road transport, coastwise shipping and internal air lines. The organisation of such a body, constituted, under the Transport Act, 1947, as the British Transport Commission, presents very formidable problems. It may prove possible to solve the problems of organisation and administration, but it will

be very difficult to preserve the flexibility which is important for efficient transport service.

It cannot be claimed that any part of the world has yet completely solved the question of co-ordination, and progress must continue for some time along experimental lines. Not only have the administrative details to be settled, but the idea of compulsory allocation of traffic has to overcome opposition. It is a task of the greatest difficulty to indicate where and under what circumstances a limitation of consumers' choice may reduce "wasteful competition" and thus promote welfare. And co-ordination involves restriction, and thereby acts as a reminder that costs, in the sense of sacrificed alternatives, are real things.

We have often been told of an Age of Plenty round the corner; our need to solve the problems of distribution, as the problems of production are supposed to have been solved, is the theme of every after-dinner speaker. The danger of this attitude is that it often ignores the fact that costs have reality; that the price of doing anything is not doing something else; that the "use of scarce means to alternative ends" and the conception of resources applied at the margin of different activities have any meaning in economics. Impatience with co-ordination is often shown by those who feel that it implies restrictions which in a proper philosophy of abundance should not exist. But, if applied in accordance with sound principles, co-ordination merely throws into relief the basis of costs as displaced alternatives, which are just as real if not so obvious under the ordinary working of the price-mechanism.

In Great Britain, and to a lesser extent in the United States, there has been in recent years an increase of

faith in controlled monopoly—partly due to improvements in the technique of State control, partly to the vicissitudes of competition at a time of falling prices. But changes in public opinion of this nature are often conditioned by political and legal institutions ; who, for instance, would deny that the Anglo-Saxon conceptions of democracy and the Common Law have not influenced the whole approach to the problems of “ planning ” in these countries ? After all, monopoly is a form of dictatorship : and although planned monopoly, like a benevolent despotism, may be a more efficient instrument of welfare than the blundering democracy of unrestricted competition, the problem of safeguards may be insoluble, since despots whose benevolence can be permanently guaranteed are few and far between. Plato’s dream of the philosopher-king has seldom come to fruition ; we may never find the economist-king.

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